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THE BIOCHEMISTRY OF DEMENTIA PRÆCOX.

A Review.[1]

By R. A. McFARLAND, Ph. D., and H. GOLDSTEIN, Ph. D.,
Columbia University.

Dementia præcox, or schizophrenia as it is now generally called, is the most serious of the major psychoses, both from the standpoint of poor prognosis and from the standpoint of economic waste. This disorder alone fills one-fifth of all the hospital beds in the United States and its cost is incalculable (49). It is presumably equally prevalent in other parts of the world. The disease is almost as baffling today as it was in biblical times. The modern psychiatrist has merely changed the disease label.

The picture of the schizophrenic individual is a familiar one. Shut in and retreating from the activities about him, a victim of more or less stereotyped conduct, hallucinations and delusions, he undergoes a gradual deterioration in personality, interests, memory and other psychological traits. The symptomology can be roughly summed up as a withdrawal from reality into a world of fantasy. It often starts early in life and may run a course of 20 to 40 years. From 25 to 30 per cent of the young patients may have a long remission resembling cure, and a considerable number have one brief episode and regain a fairly normal equilibrium lasting throughout life. If the disease has run a course of several years, the chances of spontaneous remission fall to 5 or 10 per cent. The etiology is unknown, but there is considerable evidence that the disease runs in families and also that the environment plays an important rôle in developing the symptoms. The schizophrenic seems to be born tender and exceedingly vulnerable to the "hurts of the world." Those with marked involvement appear to deteriorate steadily, while those with mild involvement live relatively acceptable lives if they can be protected from the buffets of the environment (17a).

[1] This article is the second of a series of four dealing with the blood biochemical studies of the psychoneuroses, dementia præcox, manic-depressive insanity and epilepsy.

The unreliability of psychiatric diagnosis in the case of the functional psychoses has been well brought out by Myerson (83). When to an imperfect knowledge of cause and effect there is added the psychiatrist's subjective interpretation of the patient's mental state, the result is almost as haphazard as a number picked at random out of a hat.

In an attempt to aid in the solution of these disorders, the biochemist [2] has in recent years pooled his efforts with those of the physiologist, the psychiatrist and the psychologist. He has applied reliable experimental methods in an endeavor to translate the eccentricities of psychotic behavior into the quantitative language of biochemistry.

It must be confessed, however, that to date the biochemical studies of the psychoses, and particularly those relating to dementia præcox, have done little to lift the fog of confusion and doubt. It is known that people differ as much in the activity of their chemical processes as they do in their physical constitutions. But, unfortunately, little information has come from the biochemical laboratory that is useful in classifying or diagnosing the different psychotic disorders. If we find that a dementia præcox patient has a high or low blood sugar, it does not in any way imply that equally high or low blood sugar induced in normal individuals would produce schizophrenic symptoms or behavior. Not only does the psychoneurotic and the manic-depressive show a wide day-to-day variation in this or that blood constituent, but the schizophrenic does also. Furthermore, there is great variation among the schizophrenics, indicating a rather heterogeneous grouping. Even different individuals with the same psychotic diagnosis may differ greatly in their physiological abnormalities. Certain trends have, however, been deciphered, but their interpretations are still obscure.

[2] Goldzieher (38) in discussing the possibilities of a chemical approach to the question of mental disorders states, ". . . . the effect of hormones and the tonus of the vegetative nervous system is determined by chemical agents present in the blood and in the peripheral tissues. On the other hand, the concentration of these same chemical substances within the cells or body fluids requires control by the neuro-endocrine system in order to remain within physiological limits. The physiological harmony of this neuro-endocrine-chemical triad, however, can break down at any point." Of course, the chemical approach may aid in the question of diagnosis and therapy, but is hardly to be expected to settle the question as to whether the particular psychosis caused the particular chemical picture or vice versa.

The literature on schizophrenia is conspicuous more for its quantity than for its quality. A profusion of studies revealing poor research technique in sampling of cases, experimental setup and poor statistical treatment of the obtained results has permeated the scientific journals. The variety of uncontrolled factors that may account for the lack of agreement among investigators in the field of mental illness has been discussed in a previous article (80). This paper is concerned with some biochemical studies of blood that have been made in cases of dementia præcox.

The biochemical constituents that have been most frequently investigated are blood sugar, acidity and alkaline reserve, blood oxygen and carbon dioxide, calcium and phosphorus, nitrogenous substances (proteins, total nitrogen, nonprotein nitrogen, ammonia, uric acid, etc.), cholesterol and chlorides. The list of studies cited below is by no means complete, but it is rather a selection of the researches in this field chosen because of the thoroughness of the experimental procedures.

Blood Sugar.—Kilduffe (60, page 513) states, "the sugar metabolism is controlled by the endocrine secretions acting as inhibitors and accelerators. Normally these are accurately balanced and by their compensatory interaction maintain the blood sugar within normal limits." Normal fasting blood contains from 80 to 120 mg. per 100 cc. blood.[3]

Weston (131) in 1916, using the Myers-Bailey method, studied 20 schizophrenics and found that the average blood sugar was normal (average 99.5 mg.) although differences among individuals were quite considerable. Weston (132) in 1920 found normal sugar concentrations in the blood of 10 schizophrenics. Wuth (138) in

[3] Cameron and Gilmour (13) feel that the actual figures for blood sugar content and for sugar tolerance curves depend very distinctly upon the method of analysis used and whether venous or arterial blood is being analyzed. They note that in considering sugar values determined by the Folin-Wu procedure one must remember that the values are too high by some amount of the order of 20 mg. or more per 100 cc. blood and hence represent enhanced glucose values rather than true ones. Normal true glucose values lie between 70 and 95 mg. per 100 cc. blood. While venous blood is generally more depleted in glucose content than arterial blood, they agree that the blood sugar values from arterial and venous blood, taken during the *fasting state,* show but insignificant differences. But following an ordinary meal, or a glucose meal in a sugar tolerance test, these differences are far from insignificant.

1921, using the Neubauer reduction method, tested the blood of 40 dementia præcox patients and found that the mean value was normal (average 107 mg.), although increases occurred in 37.5 per cent of the cases.

Newcomer (86) in 1922 examined the blood sugar of 15 clear-cut cases of dementia præcox. He analyzed the blood at weekly intervals over periods of from four to seven weeks and obtained normal values. He found little basis for making any distinction in the amount of scattering which their blood constituents showed, but quiet dementia præcox patients showed less variation than others. Newcomer expressed the belief that no relation exists between content of blood or reaction to changes in it and mental state.

Bowman, Eidson and Burladge (10) in 1922 studied 10 dementia præcox patients, analyzing their blood by the Folin-Wu method. The blood sugar was essentially normal, although there was a tendency toward hyperglycemia. Bowman (8) in 1923 studied 229 consecutive admissions to the Bloomingdale Hospital. The average finding (97.0 mg.) for the schizophrenics for blood sugar was normal.

Mumford and Parkin (82) in 1923, using the MacLean method, made a study of 45 subjects among whom were included several schizophrenics. No evidence was found that the mechanism of blood sugar regulation of psychotic patients differs from normal subjects. They felt that any blood sugar alterations that may occur in the mental patients are "merely normal sympathetic reactions to an abnormal extra-sympathetic stimulus." Genzel (33) studied 13 dementia præcox cases in 1923, using the Benedict method, and found that in 11 cases the blood sugar content was normal. No relation was found between blood sugar and affectivity.

Barrett and Serre (5), using the Folin-Wu method, in 1924 analyzed the blood of 20 schizophrenic patients and found normal glucose values (average 114 mg.). Looney (73), using the same method, in 1924 made a study of nine paranoid schizophrenics, eight catatonics, and 13 other unclassified schizophrenics and found normal blood sugar values. The paranoid schizophrenics averaged 87.4 mg., the catatonics, 85.4 mg., while the unclassified schizophrenics had an average of 89.5 mg.

Henry and Mangam (45) in 1925 studied 27 dementia præcox cases and found normal sugar values. Reid (103) made a study

of 39 schizophrenics in 1927. He used the Folin-Wu method and found normal values. Using the same method, Bowman and Kasanin (11) in 1929 tested 16 dementia præcox cases and found normal blood sugar values (average 98.9 mg.). No relation was found between mood and blood sugar value.

Freeman (31) in 1933, using the Folin-Wu method, reported a study of 50 male schizophrenics and 31 normal male controls. Six determinations were made of the fasting blood sugar over a period of 6½ months. In 95 per cent of the 347 determinations made on the 59 patients the values were normal, averaging 96.6 mg. as compared with 95.4 mg. for the 31 controls. No relation was found between severity of the psychosis and the blood sugar value. The hebephrenics showed the highest average level (99.7 mg.) while the catatonics showed the lowest average level (92.7 mg.). Whitehorn (134) in 1933, using the Folin-Wu method, tested 107 schizophrenics and found that only two were hyperglycemic. Hinsie, Barach, Harris, Brand and McFarland (48) in 1934 made a study of 12 schizophrenics (catatonics) and found normal blood sugar values (average 90.8 mg.). Gildea *et al.* (36), using the Hagedorn-Jensen method, studied the blood glucose of three schizophrenics and reported normal values.

Some investigators have reported abnormal blood sugar values in their studies of schizophrenia. Heidema (43) in 1919, using the Bang micro-method, found that in 10 of 13 schizophrenics a hyperglycemia existed. Kooy (64) in 1920, using the same method, found a slight increase in blood sugar in a group of dementia præcox patients. He reported that all of the results are greatly influenced by the immediate emotional status of the individual.

Uyematsu and Soda (130) used the Folin-Wu method in 1921 and studied 32 catatonics and 10 normals. In 47 per cent of these schizophrenics the blood sugar was increased. Smith and Hill (119), using the MacLean method, in 1927 found low sugar values in 10 schizophrenics.

Bowman (9) in 1927 used the Folin-Wu method and made a study of 27 dementia præcox patients. He found that half of the cases showed abnormally low blood sugar with a tendency to low readings in almost all the others. Labin (66) in 1927 studied 29 schizophrenics and reported that 48 per cent of them were hyperglycemic, 28 per cent were hypoglycemic, and 24 per cent were normal.

Many biochemical workers in the field of mental disorders have tried to see what relationship, if any, exists between sugar tolerance and dementia præcox.

Barrett and Serre (5) in 1924, using the same method, made a sugar tolerance study of 20 dementia præcox patients and found no constant relation between schizophrenia and sugar tolerance. Kasanin (53) in 1926, using the Folin-Wu method, tested 40 schizophrenics and found no characteristic sugar curve for the group, although the percentage of abnormal curves was higher than in normal subjects. Patients in a stupor usually, but not always, had higher sustained curves.

McCowan and Quastel (79) in 1931 studied 29 præcox patients and found that only two of this group had hyperglycemic indices above 50, showing that in this psychosis the hyperglycemic index is low except when the disorder is associated with toxæmia, endocrine imbalance or other physical disorders. Failure to take physical conditions into account when studying the blood sugar level of psychotics has led to erroneous conclusions. They found a close relation between the hyperglycemic index and the degree of emotional tension as measured by the psychogalvanic reflex. This index represents the ratio between the sugar line at the end of two hours and the highest point reached at any time during the reaction.

Other workers in the field have reported sugar tolerance curves that deviate from the normal. Kooy (63) in 1919, using the Bang micro-method, reported hyperglycemia to be present in 10 schizophrenics. Hyperglycemia according to Kooy might occur with any emotional state in mental disorders, no matter what the psychosis is, such as general paresis, epilepsy, dementia præcox, etc. The emotional state was responsible for the high amount of blood sugar. Emotions of a depressive character caused greatest increases in blood sugar, an unexplained seeming paradox.

Raphael and Parsons (101) in the study cited above found common features in the tolerance curves of schizophrenics that suggested a type curve. Many had a prolonged maximum level much above normal, yet glycosuria was seldom present. The curve for dementia præcox varied with the clinical phase. Lorenz (76) in 1922, using the Lewis-Benedict method, studied 52 præcox patients and found that catatonic and deteriorating schizophrenics

showed curves like those of dyspituitarism. Raphael (100) in 1922, employing the Benedict and Folin methods, tested 37 dementia præcoxes in the acute phase of their illness and found delayed sugar tolerance indicative of disturbed glycogenic and glycogenolytic functions. The investigator believed that these findings were definitely suggestive of a basic hypo-oxidative status, physiologically, with general metabolic depression and associated with vegetative features most marked in the acute unadjusted or exacerbative phases, and by that token probably reactionary or associative, although possibly superimposed upon a structure initially vulnerable.

Schryver (109) in 1923 made a study of 31 schizophrenics and reported that in some cases the rise in blood sugar level after the test meal was broken by a sudden drop. In other cases, a lowering of the blood sugar level was found after the test meal, while still other cases showed a more or less long-persisting hyperglycemia. Tsuchiya (129) in 1924, using Bang's micro-method, tested six præcox patients and found that they showed the highest blood sugar level at the end of the first hour and then maintained this level for four hours. On the other hand, normal persons, three hours after ingestion of the test meal, showed the same blood sugar level as before ingestion.

Mann (77) in 1925, using the Folin-Wu method, made tests on 17 dementia præcox patients and found that in a large proportion there was a disordered carbohydrate metabolism as shown by sustained hyperglycemia following glucose ingestion. The investigator thought that the cause of the hyperglycemia might possibly be defective pancreatic function.

Drury and Farran-Ridge (25) in 1925 studied a group of acute dementia præcox patients and found normal fasting levels but delay in returning to the starting level. In a study made in 1925, Henry and Mangam (45) tested 27 præcox cases and found more or less characteristic changes in the glucose content of the blood of patients in acute states of dementia præcox. These changes were regarded as indicating a definite retardation of functions of the vegetative nervous system. However, they might conceivably indicate endocrine sluggishness.

Smith and Hill (119) in the study cited above found that in schizophrenics the blood sugar curves are low. Bowman (9),

using the Folin-Wu method, studied 22 schizophrenics and reported that nearly one-half of the cases showed an abnormal blood sugar curve, all but one of them being of the "sustained" type. Whitehorn (135) in 1928 tested 10 schizophrenics and 10 normals, analyzing the blood for sugar by the Folin-Wu method. He found that after ingestion of glucose the schizophrenics showed an abnormally prolonged hyperglycemia.

In 1929 Mann and Scott (78) studied three præcox cases and found abnormal curves which indicated delayed glycogenesis. The investigators suggested that this abnormal sugar curve may be related to a severe defect in carbohydrate metabolism and that its main importance might be in giving some information on the acid-base equilibrium. Sleeper and Hoskins (117) in 1930 tested the galactose tolerance of 135 schizophrenics and found that 34 per cent of the cases had normal tolerance, while 8 per cent had tolerance above normal and 58 per cent had tolerance below normal.

The catatonic schizophrenics as a whole showed the highest incidence of normal tolerance and the lowest incidence of depressed tolerance, while the hebephrenics showed the lowest incidence of normal tolerance and the highest incidence of lowered tolerance. The authors believed that the galactose tolerance test had some value in the differential diagnosis of dementia præcox. They felt that a tendency to lowered tolerance for galactose was another characteristic of dementia præcox that indicated a depression of functions under endocrine or autonomic control.

Hackfield (41) in 1932 made a study of the sugar tolerance of five acute dementia præcox cases and found, in general, a delay in return of the blood sugar to normal. Ström-Olsen (123), using the Folin-Wu method, in 1932 studied a group of schizophrenics and found a disturbance of carbohydrate metabolism in the majority of cases. Katzenelbogen and Friedman-Buchman (55) in 1933 tested 31 schizophrenics and reported that 60.7 per cent of these cases showed abnormal curves.

In view of the connection with the blood sugar, it is appropriate to consider at this point the significance to date of the Sakel insulin-hypoglycemia therapy (108).[3a] Although it is too early

[3a] Another shock therapy which has aroused considerable interest of late involves the use of metrazol, a generalized convulsive agent affecting the central nervous system. It produces a temporary convulsion somewhat

to judge the effectiveness of this method of treating schizophrenia, it is interesting to report some of the results found by investigators and clinicians using this therapy. As a result of their findings, some of them have come to the conclusion that dementia præcox is a disease involving the carbohydrate metabolism of the brain. Sakel (108) reported in 1937 that after reviewing his first group of over 100 cases carefully, 88 per cent of recent cases (one-half year duration or less) had good or full remissions and could go back to their former work. Of these, 70 per cent were full remissions. In all other cases, that is, all cases of over six months' duration, the results varied in direct relation to the duration of the illness and indicated that 47 per cent of such cases showed good remissions with capacity to work, of which 19 per cent were full remissions. Paranoid types responded more favorably to the treatment than did other types. Individuals varied in their response to the insulin and in their tolerance to insulin dosage. Sakel found that therapeutic results depended not only on the production of a hypoglycemia, but on the proper use and management of every single hypoglycemia. The results did not depend upon the size of the dose of insulin, but rather upon the proper termination at the right time of each hypoglycemic state during which state one got the impression that another portion of the psychosis had been removed and more of the repressed normal personality had been allowed to achieve dominance. Since the net result was a percentage of remissions which was at least four times greater than the most optimistic figures for spontaneous remission rates, Sakel felt that his method had been quite effective and that the earlier a case was treated the more hopeful was the prognosis.

The following are some of the more recent results reported. Kepler and Moerasch (59) in 1937 treated 13 schizophrenics with

similar to the epileptic *grand mal* attack, followed by restoration to normal at the end of approximately two hours. Low *et al.* (Metrazol shock treatment of the "functional" psychoses. Arch. Neurol. and Psychiat., 39:737, 1938) have reported a high rate of recovery for persons with manic-depressive conditions and for schizophrenia patients if the treatment is given within the six months following the onset of the disease. At the Worcester State Hospital, 40 schizophrenics, selected on the basis of destructiveness and agitation, were treated with metrazol. The immediate effect of the therapy was a striking amelioration of the above traits. (L. H. Cohen. The early effects of metrazol treatment in agitated patients. To be published, Am. J. Psychiat., 1938.)

the hypoglycemic therapy and observed nervous and mental phenomena during approximately 350 deep comas. Profound changes in cerebral functions occurred during hypoglycemia. Although the exact mechanism by which hypoglycemia produced its effects on the nervous system was not observable, the investigators advanced the possibility that hypoglycemia might produce pathologic changes in the central nervous system. However, they noted that no ill effects had been encountered from the use of insulin therapy in schizophrenia. Ross (106) reported that 72 per cent of 77 schizophrenics whose treatment at the Harlem Valley State Hospital had been supervised by Dr. Sakel showed recovery or improvement, while 26 per cent were unimproved. Of 286 schizophrenics treated in other New York State hospitals, 73 per cent showed recovery or improvement, whereas 24 per cent were unimproved.

Katzenelbogen, Harms, and Clark (57) treated 16 patients, and 63 per cent recovered or improved. Wortis *et al.* (137) reported that of 30 dementia præcoxes, 70 per cent recovered or improved. The investigators concluded that the hypoglycemic insulin treatment was by far the best available for schizophrenia. Young *et al.* (139) treated 31 schizophrenics with this therapy and reported that 71 per cent of the cases recovered or improved. Men seemed to show a more favorable response than women. The biochemical facts noted showed suggestive changes that were of no prognostic significance to date.

Wilson (136) in 1937 surveyed the results of the hypoglycemic therapy as reported in a number of countries and reported that the treatment was promising. However, the degree of response to be expected could not be clinically prophesied in any case or group of cases. The investigator cautioned that, because of the difficulties of diagnosis and the variability in spontaneous course and in response to physical and psychological treatments which schizophrenia might show,[4] published statistics on the effect of insulin therapy could only be regarded as tentative. It is difficult to deduce accurately the percentage of treated cases in whom remission or

[4] Since the schizophrenic reaction tends to show considerable fluctuation both in its form and in its intensity, considerable pains must be taken to distinguish the results of treatment from the endogenous fluctuations. *Cf.* D. E. Cameron and R. G. Hoskins. Experiences in the insulin-hypoglycemia treatment of schizophrenia. J. A. M. A., 1937, 109: 1246-1249.

improvement can be definitely ascribed to insulin treatment. Furthermore, time alone will tell how permanent the alleged cures are.

Many other investigators (19, 68, 81, 97, 107, 118, 121) have reported successful results with the use of this therapy. They are of the belief that insulin recovery is better in quality and more frequent than spontaneous remission and that best results are obtained in inverse relation to the duration of illness and chronicity of the psychotic episode.

Others, however, have been unable to evaluate this form of therapy since it has not been used long enough (72, 105) and since, under the present conditions imposed in this form of therapy, it is exceptionally difficult to reach accurate conclusions as to "recovery" (133).

As yet it cannot be determined whether shock is the essential feature and whether the Sakel treatment is merely a shock therapy [5] comparable perhaps in effect to the kind of condition induced by excess carbon dioxide, sodium amytal, etc., or whether it is an attack at some basic mechanism underlying the illness. Although many investigators believe that schizophrenia is a syndrome indicative of an even more basic disturbance, some investigators, as a result of the efficacy of the insulin therapy, are of the opinion that schizophrenia is a disease involving the carbohydrate metabolism of the brain. Sakel himself felt that perhaps the insulin shock might simply be symptomatic treatment for a symptomatic syndrome. At any rate, there is considerable doubt as to how insulin shock benefits the schizophrenic.[6] The evidence is far from con-

[5] It has been found that in most instances the hypoglycemic coma is a necessary phase in the alleviation of schizophrenia.

[6] R. G. Hoskins (personal communication) has suggested that one obvious interpretation is that the repeated forced combustions might serve to burn out accumulated metabolites from the cells of the brain. In line with this suggestion is the report (*cf.* H. E. Himwich and J. F. Fazekas. The effect of hypoglycemia on the metabolism of the brain. Endocrinology, 1937, 21: 800-807) that insulin hypoglycemia causes a depression of the cerebral metabolism by diminishing the food supply of the brain (blood sugar). With diminution of blood sugar the store of carbohydrate in the brain, though small, is utilized during intense hypoglycemia and, therefore, probably supplies the materials for oxidation. The same investigator (*cf.* H. E. Himwich *et al.* Brain metabolism during the hypoglycemic treatment of schizophrenia. Science, 1937, 86:271-272) found that with prolongation of the hypoglycemia

clusive that the effects of the hypoglycemic state in schizophrenic patients are something specific to this form of disorder.

In an excellent critical review of the insulin treatment of schizophrenia, Cobb (17a) states that the microscopic and physiologic evidence suggests that there is a marked lack of oxygen during the coma and that it seems reasonable to conclude that asphyxia of the brain may play an important part in the phenomena of hypoglycemic coma and convulsions. This being the case, Cobb believes that severe insulin shock probably destroys a great number of cerebral nerve cells. Some of the changes are doubtless reversible, but experimental work on animals indicates that most asphyxiated nerve cells go on to permanent degeneration. Cobb concludes that "at present the clinical descriptions of progressive nervous disintegration during increasing hypoglycemia and the reintegration after treatment are about as close as one can come to a theoretical conception of what is happening in the brain. Certainly something important is going on that improves the mental state of patients with dementia præcox. Nevertheless, the treatment is not yet proved to be anything more than palliative, and there is some reason to believe that it may be causing permanent damage to the brains of patients who might spontaneously recover" (17a).

Acidity and Alkaline Reserve.—Kilduffe (60, page 59) in speaking of the pH of the blood states, "The reaction of the blood is maintained, in spite of the ingestion of acids and basic salts and the metabolic production, neutralization and excretion of acids and bases, by a very sensitive mechanism of adjustment. The three processes mainly concerned are the excretion of acids and non-volatile bases by the kidney, the base forming properties of hemoglobin, and the excretion of CO_2 through the lungs, the two latter being more rapid and important. The buffer system of the blood also functions, but is not of as great importance nor capable of as rapid adjustments as those just mentioned." Normal arterial

a differential depression of the functions of the various parts of the central nervous system takes place because of varying oxidation rates and energy requirements. E. Gellhorn believes that there is a considerable amount of evidence for stating that the physiologic action of hypoglycemia is primarily manifested by "a (1) reduction in the oxidation rate in the central nervous system, and (2) by the stimulation of the sympathetic centers resulting from the diminution of the oxidative metabolism." (The action of hypoglycemia on the central nervous system. J. A. M. A., 110: 1433, 1938.)

blood plasma has a pH of from 7.35 to 7.45. The carbon dioxide combining capacity of normal blood plasma is between 45 and 60 volumes per cent. Kilduffe (60) states that the normal range for pH is from 7.3 to 7.5, and for carbon dioxide combining capacity, from 50 to 75 volumes per cent.

Many investigators have attempted to determine whether there is any relation between the acid-base equilibrium of the blood and schizophrenia. The majority of the studies have revealed normal results. Pugh (99) in 1903, using the Wright method, studied the alkalinity of the blood of 10 schizophrenics and found normal values.

Schultz (111) in 1907, using a modification of the Friedenthal method, studied the hydrogen ion concentration of six catatonics and did not find any deviation from the normal. Suitsu (124) in 1920 made a study of the alkaline reserve of 47 præcox cases and found normal values (average 61.84 volumes per cent) although the inter-individual variation of the alkaline reserve seemed to be higher in the patients (average 8.2) than in the group of 15 normals (average 6.6) that served as a control group.

Thomas (126) in 1922, using the Van Slyke method, studied a group of schizophrenics and found no acidosis in the majority of cases. Henry and Mangam (45) in the study cited above tested the alkaline reserve of 27 dementia præcox patients and reported that the alkaline reserve is unaffected by psychoses unless there is some definite accompanying disease.

Appel, Farr and Hodes (2) in 1931 studied the alkaline reserve, using the Van Slyke method, and also made a study of the total base of 10 schizophrenics, using the Stadie-Ross method. They found that in cases uncomplicated by other factors the total base and the alkaline reserve were normal. Ballif and Gherscovici (4) in 1931 made a study of the pH and alkaline reserve of 50 præcox cases and found normal acid-base equilibrium in the vast majority of cases.

Hurst (51) in 1932, using glass electrodes, studied several schizophrenics and found no significant difference between the pH of normal and that of schizophrenic blood. Hoskins (49) in 1933 tested 54 dementia præcox patients and 24 normals and found that the venous carbon dioxide and blood pH were normal, on the average, but the venous oxygen was depressed. Gildea *et al.*

(36) studied four schizophrenics and found normal carbon dioxide capacity (average 46.7 volumes per cent).

Not all investigators, however, have found normal values. In 1931 Poli (96), using the Van Slyke method and the de Buscaino blood pH method, investigated a group of schizophrenics and reported an acidosis in excitable states, while depressed states were normal or slightly acidotic. Hoskins and Jellinek (50) in 1934 reported high lactic acid values in a group of 92 dementia præcox patients, although the venous and arterial pH were normal. The investigators thought that the high lactate level might be due to the lack of oxidizing catalysts in the schizophrenic.[7]

Blood Gases, Oxygen and Carbon Dioxide.—"In disease, marked variations may occur as a result of disturbance in the buffer system of the blood or disturbances in the mechanism regulating or concerned with the respiratory exchange of oxygen and carbon dioxide. Interference with the transportation of oxygen by the hemoglobin always leads to asphyxia which . . . . may be . . . . microscopic leading to interference with cellular and hence organic functional disturbances. . . . . There is always an associated increase in the carbon dioxide" (60, page 45). It has been found that under certain circumstances mental disturbances may be associated with a deficient supply of oxygen. The oxygen content of arterial blood is 17 per cent to 22 per cent by volume, while the oxygen content of venous blood is 11 per cent to 15 per cent by volume. The carbon dioxide content of arterial blood is 40 to 55 volumes per cent, while that of venous blood is 48 to 60 volumes per cent (94, page 936). The oxygen capacity is 17.8 to 21.8 volumes per cent (60, page 44), while the oxygen saturation of hemoglobin for arterial blood is 93 to 98 per cent and for venous blood, 62 to 85 per cent (60, page 47).

Some investigators have found normal blood gas values in the schizophrenic. Hinsie, Barach, Harris, Brand and McFarland (48) in 1934, using the Van Slyke-Neill method, determined the oxygen and carbon dioxide contents of the arterial blood of 15 dementia

[7] Hoskins (Arch. Neurol. Psychiatry, 1937, 38: 1261-1269) reported the existence of a relationship between lactic acid levels and glutathione in the blood of schizophrenics, which indicated defective oxidative mechanisms due to either a lack of positive oxidative catalysts or the presence of one or more negative catalysts.

præcox patients and found that the arterial oxygen content and oxygen saturation were within the normal range in 13 cases. In two cases there was a very slight decrease from the theoretically low normal value of the arterial oxygen saturation, *i. e.*, 95 per cent. In one case the arterial oxygen saturation was 93.2 per cent, in the other, 93.7 per cent, observations which verged too closely upon the normal to be considered significant. There was no evidence that the supply of oxygen to the tissues from the arterial blood was impaired. The arterial carbon dioxide content was within the normal range in all the patients studied. Gildea *et al.* (36), also using the Van Slyke-Neill method, studied four dementia præcoxes and found normal values for oxygen content, oxygen capacity, and carbon dioxide content.

Thompson *et al.* (126a) in a preliminary report dealing with the blood gases of 64 schizophrenic patients have found values within the normal range of variation in the oxygen saturation of the blood drawn from the brachial artery and the internal jugular vein of the same patients according to the method used by Lennox. In comparing the results of this study with those obtained by Lennox (Arch. Neurol. and Psychiat., 26: 719, 1931) in non-schizophrenic subjects, the means were similar, with the possible exception of the venous carbon dioxide, which appeared to be significantly higher in the schizophrenic group compared with the control group.

Recently Looney and Freeman (75a) have reported an extensive investigation of the blood gases in 112 schizophrenic patients and 67 normal subjects. They conclude that although there appears to be no difference in the levels of the blood gases in schizophrenic and normal subjects, the distribution of carbon dioxide in patients is essentially lower. Furthermore, they report significant differences between the two groups with regard to the mechanisms governing the interrelationships between the gases. Thus "the schizophrenic patients do not differ from normal subjects as far as the supply of oxygen to the body tissues is concerned, but show a certain degree of dysfunction in its utilization." They also believe "the carbon dioxide mechanism is more rigid and static in schizophrenic than in normal subjects."

Other investigators have reported abnormal blood gas values in the schizophrenic. Segal and Hinsie (112), using the Van Slyke-Neill method, made a study of 14 young male schizophrenics who

showed peripheral cyanosis and two male normal controls and found that while the oxygen capacity was normal the oxygen content was below normal and the blood showed a consequent arterial unsaturation. Notkin *et al.* (87) in 1933, using the Van Slyke method, studied 10 cases of catatonic dementia præcox and found that 87 per cent had normal oxygen capacity, 37 per cent had normal oxygen content, and 37 per cent had normal oxygen saturation. Carbon dioxide content was normal for all.

The question of oxygen deficiency [8] in the schizophrenic has been investigated from many angles. Some of these studies have attempted to demonstrate diminished oxygen content of the blood coursing through the brain [9] while others have attempted to show a deficiency of catalytic agents in the brain which are involved in the utilization of oxygen by the tissue cells. For better results and more accurate data it has been found that blood sampling should be made in parts of the body where blood is nearer anatomically to the nervous system, *e. g.*, jugular vein, carotid artery, etc., as contrasted to the periphery of the body, as in the arm or leg. The Myerson-Halloran (84) technique has made it possible to study the biochemical environment of the central nervous system more directly by safely obtaining samples of blood as it goes to and from the brain. In addition to getting quantitative information as to changes taking place in the blood stream as it courses through the brain, it is also possible, according to Doisy and Beckmann (24),

[8] It has been pointed out that a deficiency of tissue oxidation could arise from either of two mechanisms: (a) failure of the blood to carry an adequate amount of oxygen to the tissues because of reduced blood volume or lessened circulation speed; or (b) inability of the tissues to assimilate a normal amount of oxygen when the supply is adequate. Both mechanisms could also operate simultaneously. Cf. R. G. Hoskins. Oxygen metabolism in schizophrenia. Arch. Neurol. Psychiatry, 38: 1261-1269, 1937.

[9] Freeman (30) has suggested that the "manifestations of schizophrenia may tentatively be explained, from a biochemical standpoint, on deficiency in oxidative processes in the cerebral cortex." Tomasson (128), in an illuminating review of the somatic treatment of schizophrenia, feels that since at least some of the brain cells in schizophrenia are in a state of chronic irritation (of which histological evidence may be found in the brains of patients who have had schizophrenia) the reparation of those alterations in the protoplasm of the nerve cells may take place through: (1) increase of the basophilic substances of the cells; and (2) increase of the oxygen supply of the cells.

to calculate the respiratory quotient of the brain by dividing the increase in the carbon dioxide content of the venous blood by the decrease in its oxygen content, with reference to the carbon dioxide and oxygen content of the arterial blood. For further understanding of metabolic processes in the brain of the schizophrenic, there is indicated the desirability of studies of respiratory quotient in the schizophrenic and normal brains for comparative purposes as well as comparative studies of the blood chemical changes occurring in the normal and schizophrenic brains at "rest," during emotion, and during concentration. This should give valuable information as to whether the apparently subnormal metabolism and deficient oxidational reactions in the schizophrenic are primarily related to the general bodily processes or to the brain mechanisms, or to both.[10]

[10] It may be appropriate at this point to refer to several respiratory therapies, such as excess carbon dioxide and excess oxygen, sodium cyanide (a respiratory stimulant), etc., which apparently operates as "shock" procedures, perhaps in somewhat the same fashion of "passing the subject out" as the insulin shock therapy. In 1918 Loevenhart, Lorenz *et al.* (70) employed sodium cyanide as a respiratory stimulant and found some evidence of greater cerebration in stuporous patients. They (71) repeated their work in 1929, using high percentages of carbon dioxide, and found in stuporous patients, which included schizophrenics, manic-depressives, etc., a definite and invariable response which consisted of an increased blood pressure, decreased pulse rate, decrease in rate and an increase in amplitude of respiration, freer muscular movements, animated features and a moderately adequate verbal response.

Langenstrass and Buchman (67) in 1931 treated a series of patients by a combination of fever therapy, carbon dioxide and oxygen inhalations and psychotherapy. Nine patients treated thus were all successfully aroused from stupor at the time of the carbon dioxide inhalation. In general, there was marked mental and physical improvement. Solomon, Kaufman and D'Elseaux (120) concluded that by the use of the excess carbon dioxide and oxygen method there was a stimulation of the medullary center of respiration, an increase of the carbon dioxide and oxygen content of the blood, an increased flow of blood and dilation of the cerebral vessels, and an increase of intracranial pressure. They postulated the following working hypothesis to explain the apparent restoration of function by the excess oxygen and carbon dioxide method and by the sodium amytal method. "We assume that in the case of the stuporous patients there is a reduced activity of the cerebral neurones. We further assume that this possibly is dependent upon an interference with the normal metabolic activity of the cell, either in the anabolic or catabolic phase. Now when carbon dioxide is inhaled there is possibly a further lessening of this metabolic activity resulting in the lessened activity of the neurones and in the clinical manifestation of a loss of consciousness. With the cessation of the administration of carbon dioxide,

Myerson *et al.* (85) in 1931, using the Myerson-Halloran technique, punctured the internal jugular vein, right femoral vein, and left femoral artery of 10 schizophrenics breathing an air-nitrogen mixture containing 9 per cent oxygen, and reported that metabolic processes in the brain remained aerobic under these conditions. As much oxygen was removed in the cerebral circulation as in the peripheral circulation. However, it must be remembered that such comparisons are valid only if the speed of blood transit is controlled.

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the processes referred to are relieved from interference, with the result that they seek the point of equilibrium maintained previous to carbon dioxide inhalation. In so doing they are necessarily speeded up and may overstep the previous point of equilibrium, that is, approximate a more normal degree of metabolic activity with a consequent more normal degree of nervous activity shown by more normal contact with their environment. This hypothesis would similarly explain the situation in regard to sodium amytal anesthesia. As the effects of carbon dioxide and sodium amytal are only temporary, the results cannot be long-lasting, and thus in the course of a few minutes the original condition of lessened activity would again exist; that is, the original point of metabolic equilibrium of the cells would again ensue" (120).

Kelman (58) in 1932, using a mixture of carbon dioxide (60 per cent) and oxygen (40 per cent), obtained good results in terminating temporarily the mutism of 15 patients with catatonic dementia præcox. Patients became lucid within 3 minutes after removal of the mask and talked or answered questions relevantly for from 4 to 20 minutes. Favorable results were noted in younger patients (under the age of 28) treated early in the course of the stupor, possessed of good intelligence and of not too typical a schizoid personality type. Clinical improvement was noted in 13 of the 15 patients, and in 1 case recovery seemed to have been complete. D'Elseaux and Solomon (21) in 1933, using gaseous mixtures containing from 5 per cent to 35 per cent of carbon dioxide and 20 per cent to 30 per cent of oxygen, with the remainder nitrogen, studied the effects on 30 stuporous patients. Several physiological changes were induced by the inhalations, *e. g.*, degree of acidosis, high carbon dioxide content of blood, loss of consciousness, increase in ventilation, and the temporal relationship between the duration of the mental response and the high oxygenation of venous blood. However, according to the investigators, no one change or group of changes was essential to the arousal from stupor, that is, the patient might respond without the indicated changes being present, and the changes might be present without the patient responding. The multiplicity of the methods used in various clinics to arouse patients from stupors, *e. g.*, administration of sodium amytal, increase of atmospheric pressure, ogygen therapy, etc., as well as those used by the investigators, indicated to them that there was no one physiologic factor responsible in all cases of arousal. All the procedures used by them which were successful had but one thing in common, namely, a shock to the

Koch and Mann (62) in 1909 studied six brains from cases of dementia præcox and found a great diminution of the neutral sulphur content. This was not found in other forms of insanity. The investigators concluded that it did not seem unreasonable to suppose that dementia præcox might be characterized by a general bodily inherent deficiency for oxidation processes. Freeman (29) examined a number of brains of a variety of psychotics and reported that the average iron content was slightly lower in the schizoid group than in the paranoid and cycloid groups. There was, both histochemically and quantitatively, a deficiency of iron in the cortical ganglion cells. The investigator felt that the lack of this catalytic agent, so essential to the utilization of oxygen by these cells, might underlie certain features in the symptomatology of schizophrenia. Tomasson (128) in investigations of blood glutathione (a catalytic oxidative agent) found that some schizophrenic patients showed the same concentration of the sulfhydryl-compounds in venous blood as in arterial blood, which indicated that the tissues did not take up or make use of this form of sulfhydryl compound as they normally do. The reduction of the disulfid form was unusually low, which pointed to reduced oxida-

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body economy of one sort or another. It was found that the change in the mental activity of the patient appeared to depend on the nature of the shock and that certain psychologic factors altered the response.

Hinsie, Barach, Harris, Brand and McFarland (48) treated 19 catatonic schizophrenic patients with excess oxygen and excess carbon dioxide. Fourteen of the patients resided permanently in a room especially constructed so as to maintain the desired concentrations of gases (40 per cent to 50 per cent O_2 and 2 per cent to 4 per cent CO_2) over a period of three months. Nine of the 14 patients in the chamber received daily treatments of high carbon dioxide. Five control patients in the wards received daily treatments of high carbon dioxide only. The favorable results obtained in the preliminary experiments with patients in the early stages of their illness, and to whom the assistants conversed freely, were not verified in the main experiment. No attempts were made to communicate with the patients except following the excess carbon dioxide treatments. As originally demonstrated by Loevenhart *et al.* (70), periods of mental clarity for a short time following loss of consciousness were observed in many of the patients. There was some justification for the opinion that the outcome of the main experiment might have proved more favorable if patients in the earlier stages of the disorder had been selected for treatment. As a result of this study, however, the authors felt that they could not advocate this form of treatment of catatonic dementia præcox as a general therapeutic procedure.

tion in the tissues, and an alteration in the intracellular breaking down of proteins and carbohydrates, for which glutathione is of paramount importance. It has been found that schizophrenics whose illness is of long duration (more than one year) differ significantly from normals in their blood glutathione content. (*Cf.* E. Ljungberg. The glutathione content of the blood in schizophrenia. Acta Psychiat. et Neurol., 1936, 11, 369.)

Calcium and Phosphorus.—Kilduffe (60, page 551) remarks that "Calcium is concerned with maintenance of physiological equilibrium and the normal irritability of the nervous system." Calcium has an influence on the excitability of the motor systems of animals. In tetany there is a deficiency in the calcium concentration of the blood. The calcium content of normal blood serum is from 9 to 11 mg. per 100 cc. Kilduffe (60, page 570), in discussing the function of phosphorus in the blood, states that, "phosphates act as buffers but their relation to normal and pathological states is not yet determined." The normal inorganic phosphorus content of the blood plasma is from 2 to 5 mg. per 100 cc.

The investigators of the relation between calcium and schizophrenia have reported rather conflicting results. One group of investigators has reported results tending to show that the schizophrenic has normal blood calcium values.

Weston (132) in 1920, using the Lyman method, made a study of 10 dementia præcox patients and found normal values. Tomasson (127) in 1924, using de Waard's calcium method, tested a group of schizophrenics and found, in general, normal calcium values. The investigators believed that there did not seem to be an absolutely certain correspondence between calcium variations and the usual psychiatric diagnoses.

In 1925 Siegler (116) studied 12 præcox cases and found four hypercalcemic patients, while the others were normal. Henry and Ebeling (44), using the Clark-Collip method, found that in 44 schizophrenics the calcium is lowest in the catatonic type, although in all forms it is normal. Bowman (9) in 1927, using the Kramer-Tisdall method, studied 24 dementia præcox cases and found normal results.

Katzenelbogen and Goldsmith (56) in 1921, using the Clark-Collip method, studied 40 schizophrenics and found normal values. Parhon and Werner (93) in 1932 tested 19 schizophrenics and found normal values (average 10.5 mg.).

Other investigators have failed to find normal values in the schizophrenics. Looney (74) in 1925 studied 18 catatonic dementia præcox patients and reported that the calcium content in 11 of 18 cases fell below the normal low limit of 9.5 mg. The average was 9.06 mg. per 100 cc. The lowest calcium content was found in the patients with the greatest muscle tension with but one exception.

Klemperer (61) in 1926 tested 4 "manic" schizophrenics and found decreased and normal blood calcium. In a group of three stuporous catatonics she found increased calcium values which she thought might possibly be due to local blood circulatory disturbances. Gordonoff and Walther (39) in 1929 studied a group of catatonics and found increased blood calcium values.

In 1930 Gullotta (40), using the Clark-Collip modification of the Kramer-Tisdall method, made a study of 32 schizophrenics and found that 47 per cent showed hypercalcemia and 18 per cent showed hypocalcemia. The recent cases of dementia præcox showed increases in blood calcium. In quiet chronic cases it varied within the normal limits. Most of those in agitated states showed higher calcium figures, while catatonia was accompanied by diminution in calcium figures. Hepburn and Neibaum (46) in 1931, using the Clark titration method and the Roe-Kahn colorimetric method, made a study of four schizophrenics and found consistently high values (10.5-12.1 mg.), three cases exceeding 11 mg. per 100 cc. serum.

Gerundo (34) in 1931 found an excess of calcium ions in cellular medium of the blood in several cases of schizophrenia. Rizzatti (104), using the Clark-Collip modification, in 1933 studied 229 dementia præcox cases and 71 controls and found, in general, a condition of hypocalcemia. Povorinsky (98) in 1934 studied 129 schizophrenics and found increased calcium values in every case. Atkin (3) in 1937, using the Kramer-Tisdall technique, examined 70 schizophrenics and reported that there was a tendency for higher values in the schizophrenic states although there was an average value (10.48 mg.) that was normal.

Some investigators have reported normal phosphorus values in the schizophrenics. Henry and Ebeling (44) in the study cited above, studied 44 præcox cases and found normal phosphorus content. Bowman (9) in 1927, using the Bell-Doisy method, tested 24 schizophrenics and found normal phosphorus values.

Other investigators have reported abnormal phosphorus values. Kora (65) in 1927, using the Kleinman total phosphorus method, studied nine catatonics and 10 hebephrenics. In the catatonics he found the phosphorus increased above normal both in cases of stupor and of agitation. Phosphorus became lower at remission. In hebephrenics the phosphorus content varied above and below normal.

Nitrogenous Substances.—The picture of nitrogen metabolism is an important reflection of the general state of anabolic and katabolic activities of the body. The urea nitrogen of normal blood is 10 to 20 mg. per cent; of amino-acid nitrogen, 4 to 8 mg.; of nonprotein nitrogen, 22 to 30 mg.; of uric acid, 2 to 4 mg.; of creatinine, 1 to 2 mg.; of total proteins, 6.7 per cent to 8.7 per cent; of total albumin, 4.95 per cent to 7.7 per cent; and of total globulin, 1.0 per cent to 2.5 per cent.

Normal values in the schizophrenic have been reported by several workers. Adler and Ragle (1) in 1914 made a study of 36 schizophrenics and, using the Folin-Denis uric acid method, found normal values (average 1.58 mg.). Variations were within normal limits. Weston (132) in 1920 made a study of 10 schizophrenics and found normal nonprotein nitrogen, total nitrogen, uric acid, urea and creatinine. Uyematsu and Soda (130) in 1921 studied 32 catatonics and 10 normals and reported normal nonprotein nitrogen, urea, creatinine and creatine. They could find no definite and absolute blood formula for the catatonic group.

Newcomer (86) in 1922, using the Folin-Wu method, tested seven schizophrenics, making determinations once a week for periods varying from four to seven weeks. He found normal values for nonprotein nitrogen, urea nitrogen, uric acid nitrogen, and creatinine. Bowman (8) in 1923, using the Folin-Wu and Benedict methods, studied a group of dementia præcox patients and analyzed the blood for nonprotein nitrogen and uric acid. He reported normal values.

Barrett and Serre (5) in 1924, also using the Folin-Wu method, made a study of 20 schizophrenics and found normal values for nonprotein nitrogen (average 33.8 mg.), urea (average 16.2 mg.), uric acid (average 2.3 mg.), and creatinine (average 1.4 mg.). Henry and Mangam (45) in 1925, cited above, found normal urea nitrogen in 27 schizophrenics. Parfitt (90) in 1933 tested nine

dementia præcox patients and found practically normal blood urea values in uncomplicated cases.

Hinsie *et al.* (48) in 1934, made a study of 12 schizophrenics (catatonics) and reported normal urea nitrogen (average 11.5 mg.) and normal uric acid (average 3.0 mg.) values.

Another group of investigators has failed to confirm normal values. Rappleye (102) in 1919, using the Marshall Urease method, studied two catatonics and found a marked and prompt drop in the blood urea nitrogen when the patient entered into the apathetic and semi-stuporous phases of catatonia. The values were 50 per cent or less of normal values. Hammett (42) in 1921, using the Folin-Wu method, tested two catatonics and reported increased creatine values.

Frigerio (32) in 1921, in a study of a group of schizophrenics, using the Widal method, found consistently low values of non-coagulable protein in the blood. Uyematsu and Soda (130) in the study cited above found that 75 per cent of the cases had decreased uric acid.

Bisgaard (7) in 1925, using the Kober-Sogi uric method, tested a group of præcox cases and a group of normals. He found a lower residual nitrogen in the patients (average 12.3 per cent) than in the normal (average 16.2 per cent). Looney (73) in 1924, using the Folin-Wu method, studied a group of 19 controls and a group of 30 schizophrenics (nine paranoid, eight catatonic, and 13 other types, such as simple, hebephrenic, deteriorating). He analyzed the blood for total nitrogen, amino-acid nitrogen, uric acid, creatinine (and creatinine nitrogen), creatine (and creatine nitrogen), and undetermined nitrogen. In the paranoid dementia præcox cases the urea figures (average 13.0 mg.) were a little lower and creatinine was somewhat higher (average 5.90 mg.) than the controls, but there was no marked difference. In the catatonic schizophrenics he found a lower undetermined nitrogen (average 4.54 mg.) than in any other group, and a corresponding increase in urea (average 15.3 mg.), but otherwise no noteworthy change. In the mixed schizophrenics the investigator found two distinct changes: (1) the undetermined nitrogen was considerably increased (average 7.06 mg.); (2) the creatine nitrogen was diminished (average 2.11 mg.). An increase in amino-acid nitrogen was found in the blood of highly depressed cases, suggesting a

possible connection between toxic amines in the blood and mental disorders. Looney felt that the amount of creatine in the blood was related to the tonicity of the muscles.

Ljubarskaja (69) in 1927, using the Folin-Wu method, studied the blood creatine of 5 catatonics and found an increased creatine content. Reid (103) in 1927 made a study of 39 schizophrenics. Using the MacLean method, he analyzed the blood for nonprotein nitrogen and found in the depressed patients an increase in the nonprotein nitrogen of the blood which might support Looney's theory that there exists a relationship between certain toxic amines and depressed conditions.

Lipoidal Substances.—In discussing the need for studies of the lipoid constituents of the blood, Looney and Childs (75) state, "The fact that approximately 50 per cent of the brain is made up of lipoid constituents has led naturally to the question whether patients showing mental disturbances would not also show changes in cholesterol metabolism. . . . . Variations in the level of the blood cholesterol have been ascribed to changes in emotion and to disturbances of the endocrine glands, especially the thyroid gland, the suprarenals and the gonads." Duncan (27) believes cholesterol to be one of the controlling factors of cellular metabolism. Normal blood contains from 140 to 200 mg. of cholesterol, about 30 mg. of lecithin, and 600 mg. of fat per 100 cc. blood.

Some workers in the field have reported normal values in the schizophrenic. Newcomer (86) in 1912 studied several dementia præcox patients, making weekly determinations for periods ranging from 4 to 7 weeks and found normal cholesterol values. Targowla, Badonnel and Berman (125) in 1923, using the Grigant colorimetric method, studied 2 schizophrenics and reported normal cholesterol.

Heuyer (47) in 1930, using the Bang method as modified by Blix, made a study of a group of schizophrenics and a group of normals. Cases that had developed at least 2 years did not show any definite differences from the normal. Patients in depressive states were found to have low blood cholesterol. Excitable cases showed an increase. Hoskins (49) in 1933 reported results obtained by Looney on 54 schizophrenics. He found that the blood cholesterol averaged slightly low as compared with findings in a control series of 24 subjects, but the variability was so great as to cast some doubt on the validity of the difference.

Many other investigators have reported abnormal values for the schizophrenic. Pighini (95) in 1911 made a study of 14 præcox cases and 4 normals and found comparatively high cholesterol values in the patients. Parhon, Urechia and Popea (92) in 1913, using the reaction of Neumann and Hermann, made a study of a group of schizophrenics and found increases of the lipoid content of the blood serum in most cases of schizophrenia.

Cruickshank and Tisdall (18) in 1916 studied 10 schizophrenics free from renal or arterial diseases which might affect the result. The figures for cholesterol content were high. The investigators believed that this might be an expression of an unusual degree of activity of the sexual organs. Raphael (100) studied the blood fat of 37 dementia præcoxes in the acute phase and, using the Bloor method, found a relative hypolipemia. Goeble (37) in 1924 studied 11 schizophrenics and reported a hypercholesteremia to be the general rule.

In 1925 Gibbs (35), using the Bloor method, studied 67 dementia præcox patients and found that in many cases the blood cholesterol was unusually low. The investigator believed that it might be more directly correlated with sex than with any other recognized factors and that there was evidence of some disturbance of lipoid metabolism (perhaps involving the adrenal cortex) in dementia præcox. Ornstein (88) in 1925 found that hypocholesteremia predominated in schizophrenia.

Parhon and Parhon (91) in 1925 made a study of 5 schizophrenics and found some evidence of hypocholesteremia. Forsythe (28) in 1926 studied 22 schizophrenics and reported marked evidence of hypocholesteremia. The cholesterol in the patients ranged from 98 to 157 mg. per 100 cc. blood. Jacobi (52) in 1927, using the Myers cholesterol method, tested 19 cases of dementia præcox and found that the patients showed high, middle, and low values without relation to the clinical form or length of illness.

Berger and Schubina (6) in 1928 studied 60 schizophrenics and found that catatonic dementia præcox cases are hyperlipoid, while simple dementia præcox cases tend to the hypolipoid. Stenberg (122) in 1929, using the Blix modification of the Bang method, studied 75 schizophrenics and 34 normal controls and reported that early cases of schizophrenia have a higher level compared to normals in regard to total cholesterol. Total cholesterol falls to a

normal value in those cases which have been examined during remission. In older cases of schizophrenia, emotionally dulled cases lie on a statistically significant lower level than normal in regard to total cholesterol, while emotionally heightened cases form a group which in regard to total cholesterol lie on a higher level than normal, while those cases which do not exhibit marked emotional disturbances lie on a more normal level in regard to total cholesterol. Patients in a state of emotional exaltation show a statistically significant increase over the normal both in regard to total cholesterol and total fatty acids, while emotionally dulled patients have consistently low values.

Heuyer (47), in the study cited above, found that the schizophrenics developing a short time (one year or less) showed an increase in blood cholesterol, while those developing a relatively longer time (at least two years) did not show any definite differences from the normal. Paoli and Roncati (89) in 1930, using the Sachelt method, studied a group of schizophrenics and found decreased cholesterol and increased lipoid phosphates.

Duncan (26) in 1930, using the Lieberman reaction, made a study of 89 male schizophrenics and reported that the serum cholesterol was high in the dull, quiet group of dementia præcox patients. When the patient showed excessive emotional reaction, the serum cholesterol content decreased, indicating that cholesterol was influenced by the central nervous system, probably via the sympathetic system and the endocrines. The investigator believed the fall in cholesterol was probably a normal accompaniment of emotion. Shaw and Sharpe (115) in 1931 found that the blood cholesterol content in dementia præcox is greatly diminished.

Schube (110) in 1932, using a modified Myers-Wardell method and making duplicates in every determination, studied 55 schizophrenics and found a tendency to a lowered blood cholesterol in dementia præcox as a group, the majority of cases showing values below the lower limits of the normal range or in the lower limits of the normal range. In 1933 Looney and Childs (75), using the Myers-Wardell method, tested 50 male schizophrenics and 26 normal males, making four determinations on each individual over a 7-month period. No correlation was shown between blood cholesterol and emotion. The mean value for the schizophrenics was 150 mg., while for normals it was 175 mg. per 100 cc. of blood.

Dementia præcox seemed to be characterized by a slight degree of depression of blood cholesterol content. Both the patients and the controls showed great group variability in the cholesterol values. The investigators felt that the cholesterol content for a given patient cannot be used as an aid in the diagnosis of dementia præcox, since the variability is so great and the range is so wide. Consequently no single determination can be taken as characteristic.[11] Furthermore, no reliance can be placed on isolated determinations or on analyses in a few cases. The investigators were of the belief that the variability in the cholesterol content of the blood might explain the contradictory effects on the cholesterol level that have been reported after the removal of the spleen or suprarenal glands.

Sharpe (114) in 1934 reviewed the literature concerned with lipoid metabolism in mental disorders. He believed: (1) that the lecithin content of the blood in normals is about the same as in mental disorders; (2) that the cholesterol content of blood in early dementia præcox is decreased 25 per cent; (3) that the cholesterol content of blood in late dementia præcox is increased 30 per cent, which may be due to hyperactivity of the suprarenal glands.

Claude (17) in 1935, using the Grimbert-Laudat-Weill method for determination of plasma lipoids and cholesterol, studied 15 schizophrenics and 3 controls. The cholesterol average was normal with a tendency to low values. Fatty acids were also normal. Increases seemed to be noted when there was an increase in emotional tone, regardless of the malady. Brice (12) in 1935 made a study of 62 schizophrenics and 25 normals, making duplicate determinations in every case. The investigator found that the mean values of cholesterol and total fatty acids in the blood are lower in schizophrenics than normals. Variations in the absolute levels of blood cholesterol and unsaturated fatty acids seemed to be closely associated with emotional phenomena. The depression of the level of total blood fats seemed most pronounced in the apathetic stuporous group. Regression and correlation studies of the data obtained

[11] In addition to the intra-individual variation, there is evidence of a seasonal variation of blood cholesterol which must be controlled or taken into account. *Cf.* E. M. Jellinek and J. M. Looney. Studies in seasonal variation of physiological functions. I. The seasonal variation of blood cholesterol. Biomet. Bull., 1936, 1: 83-95.

pointed to further study of unsaturated fatty acids of the blood in dementia præcox.

Chlorides.—Chlorides are found in all the tissues of the organism. The chloride ion is the major anion of the blood. The chloride value of blood plasma estimated as sodium chloride is from 570 to 620 mg. per 100 cc.

Several investigators have reported normal chloride values in the schizophrenic. Weston (132) in 1920 studied 20 præcox cases and found normal chloride values. Bowman (8) in 1923 made a study of a group of schizophrenics and found normal chloride results. In 1931 Appel, Farr, and Hodes (2), using the Wilson-Ball modification of the Van Slyke method, tested 10 schizophrenics and 15 normal controls and found normal blood chlorides.

Not all investigators, however, have reported normal chloride values. Delaville and Tscherniakofsky (20) in 1929 studied three schizophrenics and found a marked increase of chlorides in whole blood and in plasma above normal upper limits. The amount of chloride generally decreased with improvement in the subject's mental health.

Variability.—Studies of the biochemical variability of the schizophrenic have proven to be illuminating. Many factors enter into the total variation and, if the data have been collected adequately, it has been possible by the technique of the analysis of variance to break up the total variation into those parts which are contributed by fluctuations *within* the individuals, by differences *between* individuals, by seasonal trends, by technical error, and by other trends. Studies of matched groups of schizophrenic patients and of normal controls have shown that the schizophrenic patients form a much more heterogeneous group than the normal controls; that is, the patients show greater inter-individual variation. Other studies using repeated tests on a few patients and a few matched controls have shown that the schizophrenic is not a particularly stable individual from a homeostatic viewpoint; that is, he shows greater intra-individual variation than does the normal. The majority of studies listed below give statistical evidence relating to inter-individual variation. No consistent attempt has been made to separate this type of variation from the variation which obtains in the individual himself. Relatively few studies relating to the intra-individual variation of the schizophrenic have been made because it is

rather difficult to obtain sufficient repetitions of a test on each individual in order to determine his personal statistical constants.[12]

Weston (131) in 1916, using the Myers-Bailey sugar method, studied 20 dementia præcox patients and found that although the average blood sugar was normal (99.5 mg.) differences among individuals were quite considerable. In 1920 Suitsu (124) made a study of a group of 47 schizophrenics and 15 normals and reported that, although the carbon dioxide capacity of the blood plasma (average 61.84 volumes per cent) of the schizophrenic appeared to fall within the limits considered normal for healthy persons, the inter-individual variation of the alkaline reserve seemed to be higher in the group of schizophrenics (8.2 average deviation) than in the small group of normals studied (6.6 average deviation).

In 1921 Uyematsu and Soda (130), using standard chemical methods, studied 32 catatonics and 10 normals, analyzing the blood for total nonprotein nitrogen, urea, uric acid, sugar, creatine and creatinine. While they could find no definite and absolute formula for the blood in this group of patients, they found that the average deviation of each constituent examined was higher than normal, which they thought suggested an unstable metabolic activity of the individual, although the statistics referred to groups only.

Bisgaard (7) in 1923, using the Kober-Sogiuru method, studied the amino acid nitrogen content of serum in a group of schizophrenics and a group of normals and found a greater range in the schizophrenic group (.192 to .413 mg.) than in the normal group (.232 to .352 mg.). However, it must be admitted that the range is a very unstable value and is largely a function of the size of the sample. In 1925 Drury and Farran-Ridge (25) made a study of a group of præcox cases and reported that the blood sugar curves

[12] In a personal communication Dr. E. M. Jellinek of the Worcester State Hospital states that "the technique of the analysis of variance enables one to obtain estimates of the average intra-individual variation when a few repetitions of the test have been carried out on each of a fair number of individuals. Furthermore, this technique enables us to determine whether the intra-individual variation is significantly different from the inter-individual variation, as well as to determine the significance of the difference between two estimates of intra-individual variation." Dr. Jellinek further states that "if we should find that individuals differ from each other significantly relative to their personal variation, we may make inferences as to the effort which the individual has to put out in order to maintain organic equilibrium in order to adapt his organism to changing conditions of the environment."

among the patients showed more group variation than do those among normal people.

Paoli and Roncati (89) in 1930, using the Sachelt method on 30 schizophrenics and 4 controls, reported great oscillation in the blood cholesterol of the patients. Sleeper and Hoskins (117) in 1930 determined the galactose tolerance one or more times in 135 cases of dementia præcox. They found that the tolerance level was variable in 24 of the 39 cases in which multiple determinations were made. It must be recognized that although some degree of intra-individual variation is indicated in this study the measure of this variation is inadequate.

Schube (110) in 1932, using the Myers-Wardell cholesterol method, studied 55 schizophrenics and 54 normal controls; he reported a greater range in the patients (55 to 300 mg.) than in the normals (110 to 195 mg.). The same criticism, however, that was made of the range above must be made again at this point. Looney and Childs (75) in the study cited above found that although the average blood cholesterol value for the series of schizophrenic patients is somewhat lower than that for normal persons, the cholesterol content for a given patient cannot be used as an aid in the diagnosis of schizophrenia. Since the variation is so great and the range so wide, no single determination can be taken as characteristic. Although the investigators talk about intra-individual variation, their results refer to inter-individual variation. However, since the publication of their study it has been found that the intra-individual variation of cholesterol is actually greater in the schizophrenic individual.

Freeman (31) in 1933, using the Folin-Wu sugar method, studied 59 male schizophrenics and 31 male normals over a period of 6½ months. He found that the group variation among the schizophrenics was higher than that among the controls, as shown by the coefficients of variation of 11.0 per cent and 6.9 per cent respectively. Hoskins (49) in 1933 tested 54 schizophrenics and 24 normal controls and found greater cholesterol group variability in the former. Hinsie *et al.* (48), using the Van Slyke-Neill method, studied 15 dementia præcoxes and reported an inter-individual variability in arterial oxygen content and oxygen capacity that was greater than normal. Katzenelbogen (54) in 1937 made an intensive study of 20 schizophrenics, determining the following 19

different constituents in the blood and cerebrospinal fluid: sugar (Folin), total protein, albumin and globulin (macro-Kjeldahl), creatinine, creatine, urea nitrogen and nonprotein nitrogen (Folin-Wu), amino-acid nitrogen and uric acid (Folin), total cholesterol and free cholesterol (Yasuda), lactic acid (Peters and Van Slyke), inorganic phosphorus (Benedict-Theis), calcium (Clark-Collip), potassium (Kerr), chlorides and carbon dioxide combining power (Van Slyke). It was found that in only 3 of the 20 patients were values of *all* the 19 constituents determined for both blood and cerebrospinal fluid *within* normal limits. In each of the remaining 17 patients one or another component proved to be abnormal either in the blood or in the cerebrospinal fluid or in both. The wide distribution of the abnormal chemical variations in these cases and the relatively small number of cases would render inadequate any comparative evaluation of the clinical and laboratory findings. The interesting point coming out of this study, however, was that of the 20 patients with a parergasic type of reaction, 17 showed deviation from the accepted normal limits for one or another constituent, either in the blood or in the cerebrospinal fluid or in both.

Summary and Discussion.—A review of the foregoing studies reveals several indications of physiological disturbances in the schizophrenic. These appear to be a disturbed carbohydrate metabolism as shown by some evidence of abnormal sugar tolerance curves, a disturbed lipoid metabolism, and a variability in biochemical constituents greater than that shown by the normal individual.

Whereas some investigators believe that there is no constant relation between schizophrenia and sugar tolerance, others believe that a disordered carbohydrate metabolism is the basis of the psychosis. Still others are of the opinion that hyperglycemia might occur with any emotional state no matter what the psychosis is. Not a few investigators have attributed the hyperglycemia sometimes found in dementia præcox to a defective pancreatic reaction or to other endocrine imbalances. However, to date there has been no evidence brought forth to show that dementia præcox is based on the dysfunction of a single gland, although some workers feel that a retardation or depression of the functions of the endocrine or autonomic system is closely bound up with the etiology of schizophrenia.

Some investigators have attempted to use the sugar tolerance curve in differentiating schizophrenia from other psychoses or in the differential diagnosis of the clinical forms of the disease. At present the sugar tolerance test cannot be used successfully as an instrument for diagnostic or prognostic purposes. The curve of the catatonic may easily be confused with the curve of the hyperthyroid; the curve of the deteriorating schizophrenic bears a close resemblance to those found in dyspituitarism. It appears that "variability, irregularity and inconsistency of the reactions to the test and complexity of the factors involved" (22, page 208) preclude the use of the sugar tolerance curve in diagnostic procedure. Individual variations that are normally hidden by averages dictate the shape of the curve. Whether a disordered carbohydrate metabolism is another symptom of a generalized schizophrenic hypometabolism remains to be shown by future research.

The physical condition of the schizophrenic, as well as his mental state at the time of the test, has usually been neglected in the interpretation of the sugar tolerance curve. On the basis of perhaps a single tolerance test, diagnosis and prognosis have often been determined. It is now known that physical conditions like toxemia, endocrine imbalance and menstrual phenomena enter largely into the shape of the particular curve whether from a schizophrenic or from a normal individual. It has been shown that the emotional tension of the patient at the time of the test has the closest relation to an abnormal sugar tolerance. Yet how many investigators have neglected to consider this important factor before they generalized their findings to cover vast psychiatric territory?

Freeman (30) in an address before the American Medical Association in 1931 states that ". . . . there appears to be in schizophrenia a generalized, inherent tendency to deficient oxidative processes. . . . ." Koch and Mann (62) demonstrated a deficiency in neutral sulphur by chemical examination of the brain of cases of dementia præcox, and Freeman (29) reported a deficiency of iron in cortical ganglion cells in dementia præcox, both quantitatively and histochemically. Both of these elements are present as catalytic agents which are involved in the utilization of oxygen by the tissue cells. Hoskins (49) states in a summary of the research on schizophrenia that "apparently most fundamentally significant is

the reduction in the activities having to do with body oxidation . . . . the circulatory efficiency and the specific dynamic action of protein." Studies of oxygen content and capacity of the blood of schizophrenic patients, however, have failed to reveal subnormal values. In many instances these studies have not been properly controlled from the point of view of the effect of emotion and hyperventilation on the blood gases.[13] Further research is needed relative to the interrelationships of the blood gases in both arterial and venous blood in schizophrenia. Even if these determinations are found to be within the normal range of variation, further studies would be indicated of the extent of the utilization of oxygen in the tissues, as well as the tissue oxygen transport system (myoglobin and part of the cytochrone complex), whose efficiency is regulated by the blood flow, the state of the capillaries, etc.

Just as the sugar tolerance curve of the schizophrenic has, on various occasions, been used by different investigators to strengthen their claims that it might be employed as a method of determining either the clinical form or duration of the psychosis or the presence or absence of a psychosis or even of emotion, in like manner studies of the lipoid constituents have been advanced to further the same claims. Some investigators have stated their ability to distinguish a catatonic from a simple dementia præcox on the basis of the blood lipoid value. This claim has been refuted by the work of other investigators who have found that the cholesterol values obtained bear no relation to the clinical form of the psychosis. Some have found that no single cholesterol test has any value in diagnosis because of the great variability in the same schizophrenic from day to day as well as the wide range from patient to patient.

Several investigators have stated that early cases of dementia præcox showed increased cholesterol values, while those of long standing showed decreased values; that excitable cases or states showed increases and that depressed cases or states presented decreases. Other investigators have not only failed to confirm these findings but have reported exactly the opposite results. More recent

[13] A general criticism of the studies of arterial oxygen saturation is that the patients have often been emotionally upset. This should be controlled by having the patient attached to a spirometer to see whether hyperventilation is taking place and thereby bringing the saturation up to the maximum normal value. The desirability of avoiding conditions that may excite the patient at the time of puncture cannot be stressed too highly.

researches have failed to reveal any correlation between blood cholesterol and emotion or duration of psychosis in schizophrenia. The endocrine system, particularly the activity of the gonads and suprarenal glands, has been designated by various workers as the etiological factor of the different cases of disturbed lipoid metabolism that have been reported. Of course, many cases of normal lipoid metabolism have also been found. How can these different findings be reconciled? A long-section study of the cholesterol values of a group of dementia præcox patients has revealed inter-individual and intra-individual variations in the schizophrenic that are greater than those found in normals. A dementia præcox patient might have a high cholesterol content at one test and a low one several days later.

The variability of the schizophrenic brings up many important questions. The psychiatric diagnosis of schizophrenia as well as its physiological heterogeneity coupled with a defective homeostasis are some matters that need further clarification and research.

Campbell (14) in discussing the term schizophrenia states that it ". . . . is widely applied to cases in which hallucinations and delusions are prominent symptoms, and which do not obviously belong, on the one hand, to well recognized etiological groups such as the organic or toxic psychoses, or, on the other hand, to well defined types of reaction, such as the affective (manic-depressive) or the hysterical." [14] The difficulty of the research worker interested in the schizophrenic reaction is brought out by Campbell in the following: "The physician interested in the schizophrenic type or reaction finds himself dealing with an extremely large group of individuals. He has no guarantee that the group of patients is a homogeneous group; he cannot say *a priori* that the patients are suffering from some unitary disorder. He has no Widal or Wassermann test as a specific criterion." As a group, schizophrenic patients are rather heterogeneous relative to the biochemical variables considered, and this might well be used as an argument against the concept of schizophrenia as a nosological entity. The mental state which is the basis of the psychiatric classification of the mentally disordered is not determined solely by

[14] Katzenelbogen (54) has noted that "the term schizophrenia, or parergasia, is applied to a wide range and variety of psychotic manifestations and . . . . the kraepelinian classification, for all its convenience, is hardly illuminating."

any one particular physiological disturbance but rather by a variety of causes. The net result of all these causes, physiological, psychological and others, is the psychotic condition.[15] Hoskins and Jellinek (50) have adequately emphasized this point. "That the term schizophrenic is merely a convenient abstraction is indicated first of all by the abnormal scatter in the distribution of numerous functions. Since these variations from individual to individual are, in general, only slightly if at all correlated with the depth of the psychosis, as such, they cannot be regarded as due to varying degrees of operation of a common etiologic factor."

The schizophrenic usually reveals normal average values for his blood constituents. But averages, like many other things, cover a multitude of sins. Their importance is in their indication of central tendencies and trends, but therein their significance stops. The degree of variation of a group or the degree of variability of an individual is obscured by a number that signifies the mean. It is only recently that attention has been drawn to the fact that the mentally disordered individuals present greater inter-individual and intra-individual variations than do normal individuals. The schizophrenic has been found to be a highly variable individual.[16] Likewise, the schizophrenic group is more variable than a normal group. Hence, generalizations that have for their basis single observations or determinations, or the averages of these observations, are rather limited in significance and value.

[15] In order to secure any semblance of consistency in results from a study of schizophrenia it is obvious that the schizophrenic reaction group must be broken into valid entities if it is, in reality, a composite of such entities. Such inconsistency as is found at present lends support to the belief held by some investigators that the schizophrenic psychosis is a multitude of disorders of various etiologies and that the schizophrenic reaction is merely a symptom common to this heterogeneous group. The biochemistry of schizophrenia may ultimately prove to be as meaningless and inconclusive as the biochemistry of backache or of abdominal pain simply because patients have been classified on the basis of reaction type rather than of etiology.

[16] Dr. E. M. Jellinek (personal communication) states that in recent studies at the Worcester State Hospital repeated observations for a large number of variables on schizophrenic patients as well as normal controls revealed that in practically 80 per cent of the variables the intra-individual variation of the schizophrenic individual was greater than that of the normal control, and from this type of data it was possible to make inferences as to homeostatic conditions.

The great variability of the schizophrenic must be intimately related to a defective homeostasis. Whereas the normal individual may show variability from day to day in biochemical constituents or other functions, the schizophrenic shows this variability in greater degree. A living organism "preserves its integrity only by the operation of an intricate series of adaptive mechanisms. When any stress is imposed upon the organism, this tends automatically to set into operation mechanisms to counteract the impinging stress and preserve the internal milieu in a 'steady state'" (16). The adaptive mechanisms possessed by the schizophrenic to preserve this "steady state" are defective, and hence he swings like a physiological pendulum from one extreme to the other, whereas the adaptive swing of the normal individual is a much shorter and slower one.[16a] The schizophrenic possesses what has been called "physiologic clumsiness" (50). This "physiologic clumsiness," because of its very nature, cannot be studied by a cross-section method.[17] A single determination gives no more indication of the degree of metabolic instability of the schizophrenic than it does of his physiological or psychological status.[18] Long-section serial studies of the schizophrenic over a protracted period of time are necessary[19] in

[16a] It has been reported that the schizophrenic physiology is less susceptible to change than that of the normal individual. This set or fixed type of physiology (as shown by repeated observations on blood gases, cardiac output, and respiration of the schizophrenic) is one which cannot readily adapt to the ever-changing internal and environmental demands, and hence would, of necessity, allow greater fluctuations in the internal milieu. *Cf.* Thompson *et al.* (126[a]).

[17] Campbell (15) brings this point out well. "A patient is said to have a psychosis but he does not have a psychosis in the same sense that he has a bullet in his leg. A psychosis cannot be extracted from the patient for study, although some workers seem not only to extract psychoses but chop them up into syndromes and use them as counters with which to play complicated games."

[18] Diethelm (23) has pointed out that "the mere accumulation of data, especially without repetition of tests on the same patient and under varying conditions, cannot be interpreted. Investigations of physiologic functions in personality disorders have frequently, therefore, given varying and even contradictory results."

[19] Shakow (113), in discussing the psychological approach to schizophrenia, has stated that "The continuous—as opposed to the discrete—method is the most promising in work with the mentally abnormal. As for the length of the study, repeated observations with intervals seem to be necessary."

order to study any defects in adaptive physiological efficiency, any improper adjustments or defects of physiological integration.[20] Kooy (63) has adequately voiced this stand in urging that "many examinations of dementia præcox patients are necessary in many different conditions of mood and also a careful comparison with other bodily reactions before we are in a position to draw any conclusions."

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[20] Dr. E. M. Jellinek (personal communication) feels that the main task of biological workers "is to devise all their investigations in such a manner that it would be possible to distinguish the sources of variation and then apply such quantitative methods which will estimate the contributions of the sources efficiently."

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PHYSIOLOGICAL STUDIES IN EXPERIMENTAL INSULIN AND METRAZOL SHOCK.*

A Composite Preliminary Study by Members of the Department of Medical Research, Banting Institute, University of Toronto.

Presented by G. EDWARD HALL, M. D.

The use of metrazol and insulin shock therapy in schizophrenia has prompted several investigations in the Department of Medical Research upon the physiological actions of these agents given in convulsive doses.

Up to the present time little experimental work has been undertaken to investigate the rationale of such treatment and to understand the nature of the changes which result in the almost dramatic improvement shown by these patients.

The experiments to be reported here have been carried out by different members of the Department. At the present time many other experiments are being performed and consequently little attempt can be made to correlate these findings.

EXPERIMENTAL.

(I) Possible Changes in Fluid Content of Brain Tissue.

(R. C. Sniffen and D. A. Irwin.)

Injections of 30-50 per cent glucose solutions are used clinically to decrease the amount of cerebral œdema. Similarly, prior to cerebral operations glucose is administered in order to produce dehydration of the brain. The question then arises as to whether or not the repeated hypoglycæmic states in insulin shock therapy produce a mild œdema of brain which in some manner affects the irritability of cortical cells, or possibly, the periodic "ebb and flow" may remove the "toxic material" from the brain cells, considered by some authorities as the ætiological factor in dementia præcox.

* Read at the ninety-fourth annual meeting of The American Psychiatric Association, San Francisco, June 6-10, 1938.

Doctors Sniffen and Irwin have found that the moisture content of rabbit brain, taken under standard, controlled conditions, was not altered significantly when hypoglycæmia was produced by the subcutaneous injection of insulin. A mild hyperglycæmia, likewise, had little effect upon the moisture content. (Table 1.)

TABLE 1.

Rabbit No.	Treatment.	Blood sugar mg/100 c. c.	Per cent moisture		
			Brain.	Liver.	Kidney.
1	Control	118	78.7	69.9	77.0
2	Control	125	76.9	71.5	76.5
3	Insulin, 1.5 μ/kilo	52	78.5	70.1	77.2
4	Insulin, 1.5 μ/kilo	49	76.7	69.6	77.0
5	Insulin, 1.0 μ/kilo	73	76.9	71.7	78.7
6	Insulin, 1.0 μ/kilo	78	76.5	69.1	76.5
7	Intravenous glucose, 10 c. c. 25 per cent.	127	75.7	62.1	78.0
8	Intravenous glucose, 10 c. c. 25 per cent.	123	79.1	70.8	79.7

As far as these workers could determine, there was no histological finding in brain tissue which might indicate the degree of hypoglycæmia. Using Best's carmine stain no glycogen could be demonstrated in brain tissue either in the normal or insulin-treated rabbit.

(II) Glycolysis of Brain Slices.

(Bruno Mendel.)

In order to determine whether changes in carbohydrate metabolism of the brain resulted from daily insulin shock treatment in rabbits, Mendel has carried out a series of experiments where the aerobic and anaerobic glycolysis of brain slices were determined by the Warburg method. No significant change could be found which would indicate a trend towards aerobic glycolysis in the insulin treated rabbits. The differences in the lactic acid concentration of simultaneous samples of blood taken from the jugular vein and carotid artery were found to be within normal limits.

(III) Cerebral Blood Flow Changes During Shock Therapy.

(B. Leibel and G. Edward Hall.)[1]

When patients are treated with metrazol and insulin to the shock state it seems probable that many of the shock symptoms may be due to a decrease in the blood supply to cerebral tissue resulting in a relative ischemia or anoxia. This phase of the problem was carried out experimentally by Leibel and Hall.

Using a greatly modified, flexible thermostromühr simultaneous records of blood flows in carotid artery and meningeal branch of the jugular vein were made in rabbits throughout the course of 128 shock experiments.

Normal venous and arterial blood flows were recorded for one hour. Blood was taken for initial glucose determination.* Insulin was injected subcutaneously (2 units per kilo). Blood sugars were estimated at half-hour intervals for 1½ hours, after which 15 minute samples were taken. Blood flow readings were taken at intervals of 2 minutes or less.

The animals usually developed convulsions within 1½-2 hours (Fig. 1). At the onset of the convulsions the blood sugar was always 6 mg. per cent or less. During the convulsions the blood sugar was always undetectable. In the coma stage, following the initial convulsion, the blood sugar fluctuated from 6 mg. per cent to 8 mg. per cent. Spontaneous secondary convulsions frequently occurred, during which time the blood sugar was again undetectable.

At the onset of the primary convulsion the blood flow (Fig. 1) in the cerebral branch of the jugular vein increased very markedly, even up to 50 per cent, while at the same time the arterial blood flow remained constant. This initial phase was followed by a simultaneous decrease in both arterial and venous flow to as low as 25 per cent of the normal level.

In cases where the animals did not go into convulsions there were no significant changes in blood flow, even though the blood sugar had decreased from 95 mg. per cent to 8 mg. per cent.

* True glucose was determined on 0.3 c. c. blood precipitated by the method of Herbert and Bourne[2] and glucose determined by a modified Shafer-Hartman reagent (Harding and Downs).[3]

Shock was induced by metrazol injections in another series of animals prepared in a manner similar to that already described. It has been found that typical convulsions are produced in rabbits (2-3 kilo) by the intravenous injection of 0.75 c. c. of a 4 per cent solution of metrazol in distilled water.

Following the injection of an effective dose of metrazol (Fig. 2) the animal almost immediately went into a very typical convulsion

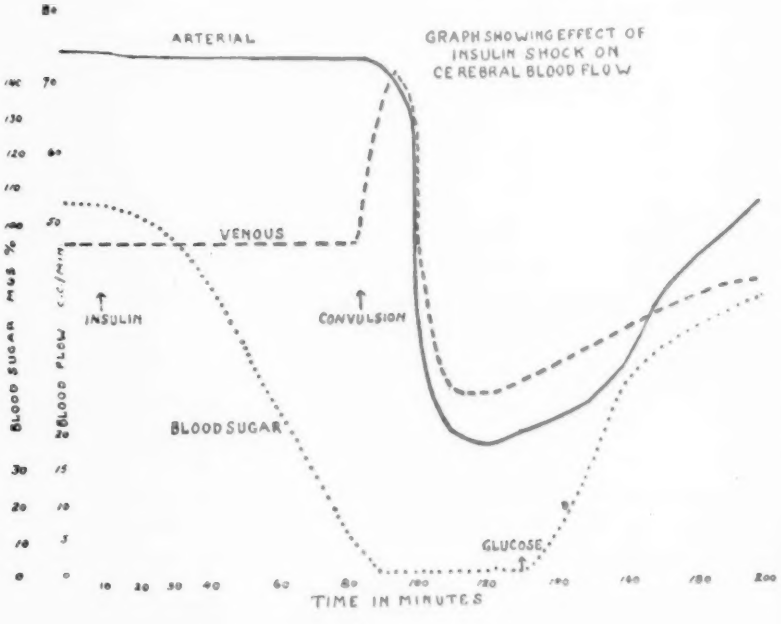

FIG. 1.

which lasted about 2 minutes. This was followed by a semi-comatose state which persisted for several hours. Co-incident with the beginning of the convulsive state the arterial and venous blood flows decreased rapidly to one-half or even one-fifth of the normal flows. The blood flow rates returned to normal in an irregular fashion suggesting the widespread cerebral arteriolar effects brought about by the metrazol injections.

The tremendous fall in blood pressure during the actual convulsions made it impossible to obtain blood samples from the ear

for sugar estimations. However, in the post-convulsion state there was a definite hyperglycæmia which persisted for several hours (Fig. 2).

Thus in insulin shock there was an initial increase in venous return from the brain, suggesting a decrease in size of the brain, while the arterial flow remained constant. This phase was promptly followed by a simultaneous decrease in blood flow in

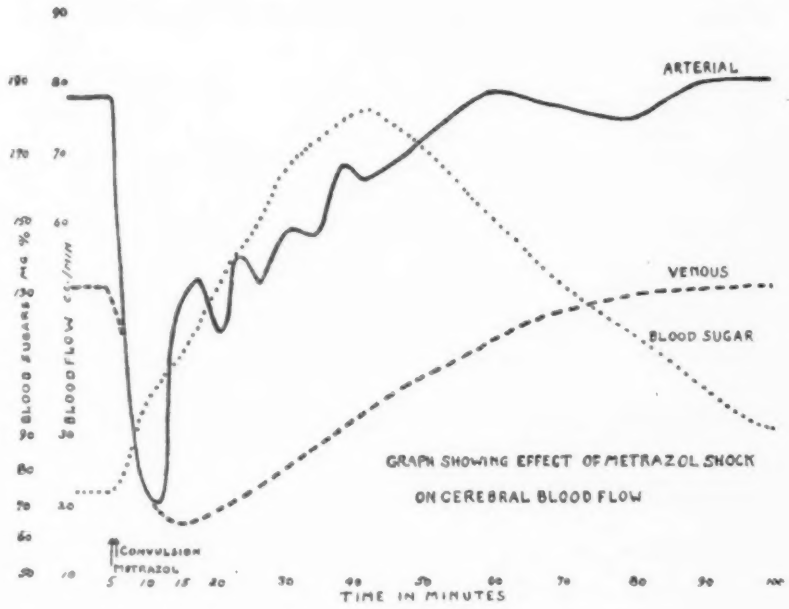

FIG. 2.

both the arterial and venous sides to such an extent that cerebral anæmia was inevitable.

The blood flow changes during metrazol shock were even more rapid. The decrease in cerebral blood flow, both arterial and venous, was sufficient to produce a severe and prolonged cerebral anæmia.

(IV) Action of Metrazol and Insulin on Brain Potentials of the Rabbit.

(J. E. Goodwin, D. P. C. Lloyd and G. Edward Hall.)[4]

That such a degree of cerebral anoxia would produce a change in the brain potential of these rabbits was almost certain. Goodwin, Lloyd and Hall have investigated this aspect of the problem.

Recordings have been made with electrodes of the type described by Rheinberger and Jasper[5] placed symmetrically on the

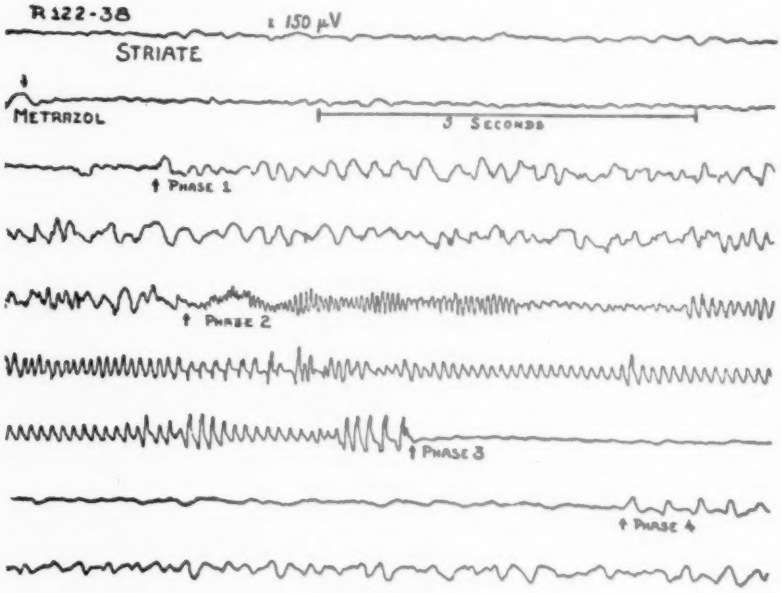

Fig. 3.

precentral and striate areas of the rabbit. Potentials were led through condenser coupled amplifiers to moving coil oscillographs. Other records were made with paired silver tube electrodes (Adrian)[6] following trephination. Curare and artificial respiration have been used in experiments with metrazol to obviate the gross movement artefacts, but with insulin, the use of curare has been found impractical, due to its hyperglycæmic action, which prevented the occurrence of convulsions in all our earlier experiments.

Metrazol.—Fig. 3 shows a continuous record of the average metrazol convulsion, the potentials being recorded with paired

leads on the area striata. There are four clearly defined phases following the latent period, which varies from 3-12 seconds. Phase 1 lasts from 2-21 seconds in primary convulsions and has a wave form very close to that recorded in human petit mal epilepsy. This phase is usually absent in the later secondary convulsions which often occur. Phase 2 lasts from 23-75 seconds, phase 3 from 0-13 seconds, while phase 4 is prolonged, lasting for one hour and up.

The first and second phases are probably due to the direct action of the metrazol. The third phase is possibly a true post-activity

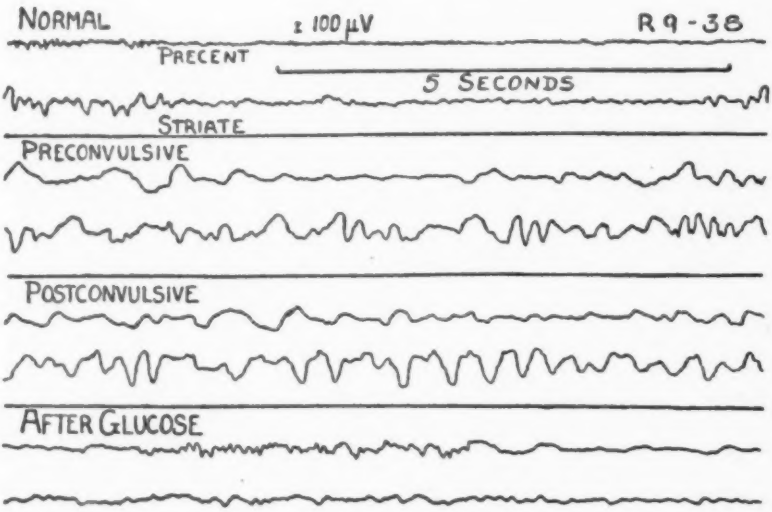

FIG. 4.

depression. The fourth phase may be due to the diminished blood flow noted by Leibel and Hall [1] with a resultant impairment of cortical function. No exact correlation with motor phenomena has as yet been possible due to the necessity for using curare.

Insulin.—Fig. 4 shows representative excerpts from a record obtained with bilateral leads on the precentral and striate regions. There is a progressive increase in slow wave activity during the preconvulsive stage. Following the convulsion the slow random type of wave continues for some time. Glucose, given in either the preconvulsive or post-convulsive stage will interrupt the slow

wave production, substituting a more normal type of activity. Immediately following a convulsion there may be a period of post-activity depression as in the case of the metrazol experiments.

A prolonged course of injections of insulin or metrazol in convulsive doses (30-36 injections over 58-63 days) has not appreciably altered the course of the convulsive response from that observed in previously untreated animals.

The most conspicuous similarity between the actions of metrazol and insulin on cortical potentials is the prolonged phase of random slow wave production, which may possibly be correlated with the period of reduced cerebral blood flow and coma.

(V) Effect of Autonomic Drugs on Metrazol Convulsions.

(B. Leibel and G. Edward Hall.)

Metrazol is used in doses of 6-7 cc. of a 10 per cent solution in schizophrenic cases. Hall has found that 0.75-0.80 c. c. of a 4 per cent solution will produce typical convulsions in almost 100 per cent of rabbits weighing from 2-3 kilo. This dose represents the equivalent amount as used in human subjects—(0.3 c. c./kilo of a 4 per cent solution).

Leibel and Hall then found that when 4 mg. of ephedrine were injected intravenously into rabbits that 0.75 c. c. of the metrazol did not produce convulsions. It was necessary to increase the dose of metrazol to 1.6 c. c. before convulsions were elicited. In a few recent experiments metrazol convulsions in untreated animals were alleviated by the rapid injection of 8 mg. of ephedrine. Ephedrine, therefore, appeared to decrease the convulsive effects of metrazol.

On the other hand, we found that epinephrine hydrochloride (0.5 c. c. 1 : 10,000) very definitely enhanced the metrazol effects, typical convulsions being produced with as little as 0.4 c. c. metrazol ($\frac{1}{2}$ the normal convulsive dose). By increasing the epinephrine to 1 c. c. convulsions were produced by the subsequent injection of as little as 0.2 c. c. of metrazol. This is $\frac{1}{4}$ the normal convulsive dose.

The results of these two conflicting series of experiments with two closely related sympathetic drugs are difficult to explain. However, when parasympathetic drugs were used before the

injection of metrazol, effects similar to those produced by the epinephrine were obtained.

In rabbits previously injected subcutaneously with 12.5 mg. (0.5 c. c.) of acetylcholine convulsions were produced with as small a dose as 0.3 cc. of metrazol solution. In another series of experiments the amount of acetylcholine injected was varied, the subsequent dose of metrazol being kept constant at 0.4 c. c., which is ½ of the normal convulsive dose; convulsions were still produced by this amount of metrazol when the initial injection of acetylcholine was as little as 0.15 c. c. (5 mg. acetylcholine).

Another parasympathetic drug, pilocarpine, was used in a similar group of experiments. Using 2 c. c. of pilocarpine solution, equivalent to 10 mg., typical convulsions were obtained with 0.5 c. c. of metrazol. Regardless of the severity of the convulsions many of the animals returned to apparently normal condition, but all died within about 1 hour.

When the parasympathetic nervous system was rendered ineffective by the intravenous injection of 0.6 mg. of atropine, typical convulsions were produced only by very large doses of metrazol. With doses of 0.75 c. c. mild clonic movements were observed. With increasingly larger doses the typical first clonic stage was produced, followed by a very brief tonic stage, which again was followed by the typical second clonic phase. Doses as large as 3.2 c. c., as compared to the normal fatal dose of about 1 c. c., were given without any fatalities and without any obvious after-effects.

Twenty-five per cent more metrazol was needed to induce convulsions in another series of rabbits when the blood flow had been increased by previous inhalation of 3 min. of amyl nitrite.

The results of these several groups of experiments appear conclusive in themselves and suggest interpretations which are at present being investigated by Goodwin, Hall and Lloyd, by means of brain potential recordings from the exposed cortex.

(VI) Glutathione in Experimental Insulin Shock.

(W. R. Franks and A. E. Byrnes.)

At the present time little is known as to the intimate mechanism of the convulsive action of insulin hypoglycæmia. As early as

1930, Sakuma [7] noted the similarity between insulin hypoglycæmia and glyoxal poisoning. The finding by Meldrum,[8] and since confirmed by others, that in vitro some intact cells maintain their glutathione in the reduced state only in the presence of glucose, suggested a mechanism for the insulin activity. As Lohmann [9] had shown, reduced, but not oxidized glutathione acts as a co-enzyme to control the activity of glyoxalase—the enzyme system that removes any methylglyoxal from brain tissue. If the glutathione is oxidized in the absence of glucose, as for instance, in insulin hypoglycæmia, the glyoxalase activity would be reduced and methylglyoxal presumably left to accumulate to give the symptoms of insulin shock.

The reduced and oxidized glutathione was consequently measured in normal and in insulin shock animals. The iodometric method of Woodward and Fry [10] was used on sulphosalicylic extracts of rabbit blood and the brain of mice. No significant difference was found in the iodine reducing substance of either the blood or brain extracts in insulin shock as compared with controls.

Further, no difference was noted in the reduced ratio after zinc reduction. Six rabbits and 16 mice were used.

(VII) Anti-insulin Activity of Serum of Insulin-treated Patient.

(F. G. Banting, W. R. Franks and S. Gairns.)

In connection with the repeated administration of large doses of insulin, Looney and Cameron [11] and others have reported a decrease in sugar tolerance. These authors also noted a significant increase in fasting blood sugar levels. Through the co-operation of Dr. N. L. Easton, Director of Research of the Ontario Hospitals, we have had an opportunity to examine blood from a schizophrenic patient who developed a resistance to insulin to such a degree that successful shock could not be obtained. For example, Dr. Easton found that with her first insulin treatment on May 31, 1937, 20 units reduced her blood sugar from 88 to 70 milligrams per cent within 2 hours. However, after 59 treatments with increasing doses of insulin, 1000 units in one dose reduced her blood sugar from 115 mg. to only 80 mg. per cent

after the same period. It will be noted that during this time the patient's fasting sugar level had increased from 88 to 115 mg. per cent. On examining the patient's serum a definite ability to inactivate insulin was found, as shown in Fig. 5. Varying amounts

ANTI-INSULIN ACTIVITY OF SERUM OF INSULIN-TREATED PATIENT.
Measured by Protecting Mice Against Insulin Convulsions.

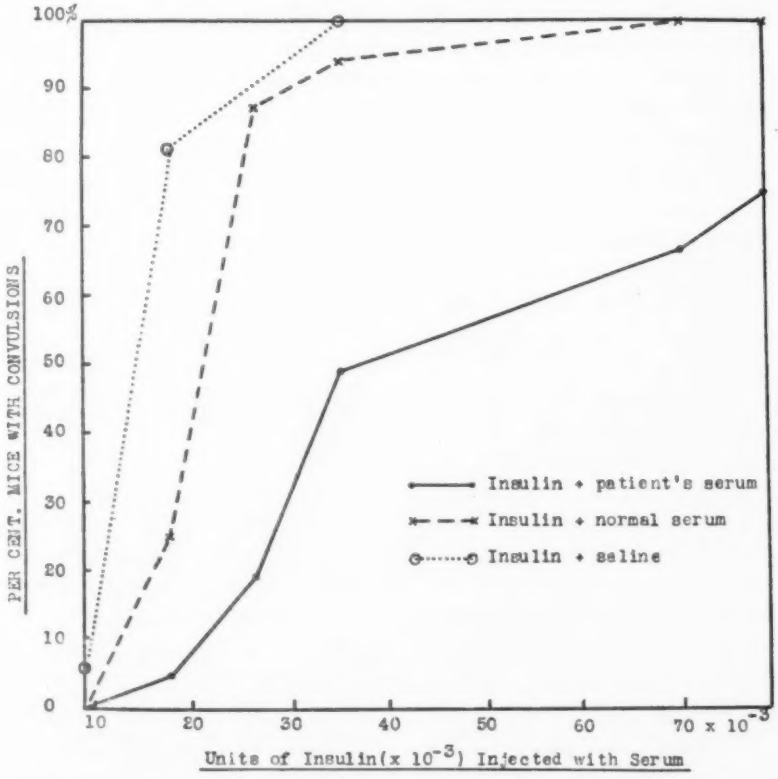

FIG. 5.—1 Vol. of Serum Plus 1 Vol. Insulin Incubated 30 Mins. Then Injected Into Mice.

of insulin were mixed with the patient's and normal control serum and after half an hour the residual insulin activity was tested by injecting fasting mice which were then kept at 38°C. The activity was assayed by the per cent of the mice having convulsions within an hour and a half. The anti-insulin factor in the blood

appeared to be precipitated with the globulin fraction and was non-dialysable. The possibility of this response being due to adrenalin is thus slight, but excess pituitary diabetogenic or glycotropic factor (Young)[12] cannot be definitely ruled out. The relation of such a possible pituitary dysfunction to the clinical picture of the patient is under investigation.

Evidence of anti-insulin activity of the serum was found to be abolished by previously keeping the test mice on a high carbohydrate diet, which, as shown by Himsworth,[13] increases their sensitivity to insulin. The use of high carbohydrate diets to increase the insulin sensitivity in such patients is to be considered. It is to be noted that despite the development of the insulin refractory state with increased fasting blood sugar level, yet with the absence of actual "shock" from the insulin, the patient still requires hospitalization..

DISCUSSION.

Insulin shock with the associated hypoglycæmia and metrazol shock with a post-convulsive hyperglycæmia, both appear to have marked beneficial effects in the treatment of schizophrenia. The physiological factors here involved seem to be unrelated.

Himwick, Bowman, Fazekas and Orenstein[14] have found that metrazol convulsions in schizophrenics cause a temporary but marked depression of cerebral functions. Such a depression can readily be accounted for from the results of our own experiments on the changes in cerebral blood flow following metrazol injections. The former authors have also found that the anoxemia as well as the severe muscular effort induced by metrazol combine to increase blood lactic acid and blood sugar. Our experiments, in rabbits, have shown that a post-convulsive hyperglycæmia results from metrazol administration. When convulsive movements are inhibited by the use of curare, a hyperglycæmia still follows the administration of metrazol.

On the other hand, when the muscular movements are inhibited by curare, in insulin-treated rabbits, no convulsions, as indicated by the brain potentials, occur. This may be due to the fact that the lack of tone and activity in the muscles precludes any possibility of the blood sugar decreasing to a convulsive level. Curare

may, however, have a direct effect upon glycogenolysis or upon the adrenal glands initiating an increased secretion of adrenalin.

Nadler and Berger [15] have reported that metrazol appeared to have no significant effect upon the splanchnic circulation or the blood pressure of anæsthetized dogs, although convulsions were produced. We have found consistently that neither insulin nor metrazol convulsions could be produced in rabbits under anæsthesia, but could be produced daily in the unanæsthetized rabbit. We have found also that in metrazol convulsions the blood pressure decreases very markedly throughout the first clonic and the tonic phase of the convulsion. This corresponds with the period of decreased cerebral blood flow which, in turn, may possibly have a direct relationship to the changes observed in the brain potentials as recorded from the exposed cortex.

The influences which the sympathetic nervous system may have upon the functional activity of the brain are rather obscure. Leonhard [16] has claimed great success in the treatment of melancholia by the use of ergotamine tartrate—a sympathetic depressing drug. Baber and Tietz [17] likewise have reported success in the treatment of psychotic patients by the use of the same drug.

From our own experiments it appears that both the sympathetic and the parasympathetic nervous system may play important rôles in controlling the functional activity of the brain. The experiments which are being conducted at the present time should give us a much clearer interpretation of this control.

CONCLUSIONS.

It is impossible at this time to draw any adequate conclusions from all of these experiments. It is more and more obvious, though, that for the successful study of the schizophrenic problem a closer relationship must be built up between the clinical studies and the experimental investigations. We, in Toronto, are fortunate in having the wholehearted co-operation of Dr. Hincks, Dr. McGhie and Dr. Farrar in the investigation of this problem.

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EARLY SCHIZOPHRENIA.*

By D. EWEN CAMERON, M. D.

The purpose of this paper is to survey certain aspects of early schizophrenia—the symptomatology shown during this phase of the disorder and problems involved in the early detection of the condition.

Investigations which we have carried on during the last two years into the newer therapeutic techniques used in schizophrenia have led to considerable preoccupation with patients in whom the disorder has shown much less progression than one finds in the usual schizophrenic individual dealt with routinely in hospital. From our experience and from the reports of other workers in this field it appears that the therapeutic results to be obtained are considerably better in patients in whom there has been little progression towards chronicity (Sakel,[1] Dussik,[2] Meduna[3]). Indeed there is good reason to believe that with our therapeutic resources at their present level of development, their applicability to the state hospital situation will be considerably curtailed if we do not succeed in detecting cases earlier and insuring their being brought promptly under treatment (Cameron[4]).

With a view to obtain information to be used in facilitating this, we have investigated a series of 100 patients suffering from schizophrenia, who have been admitted to hospital for the first time. Fifty of these patients have been discharged either as recovered or in social remission at the end of their first year of hospitalization, and 50 were still in hospital at the end of two years. The series was collected on this basis to ensure our obtaining a comprehensive sample.

The study was confined to the earlier manifestations of the disorder as it occurs in adolescents and adults. Consideration of young patients was omitted because the forms of sex activity and the inter-personal relationships of children, as well as their language development, are necessarily different from those shown

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by older persons (Potter [5]), and it is with the latter that our research activities have to deal. Moreover, as we at present understand the relative incidence of schizophrenia in children and adults, it is the latter which, from our present point of view, presents by far the more important problem (Kasanin and Kaufman [6]).

The cases were investigated from the following points of view:

Earliest Non-Specific Symptoms.

Our earlier experience has shown that antedating the clinically recognizable symptoms there is a group of behavior changes which we refer to as non-specific for the reason that they can be found preceding the development of disorders other than schizophrenia. Our inquiry was first directed towards determining how regularly these non-specific symptoms were reported, what their nature was, and how long before the occurrence of recognizable schizophrenic symptoms these earlier manifestations appeared.

In reporting these earliest behavior changes, the relatives and friends of the patients made use of a considerable range of descriptive terms, as can be seen from Table I. It was found, how-

TABLE I.

Non-Specific Early Symptoms.

Terms used by relatives to describe patients' behavior. Synonymous terms in parentheses.

Elements of a hyperactive pattern.	
Nervous (restless, tense).	Moody.
Sleepless.	Impatient.
Worried (uneasy, apprehensive).	Tantrums.
Nightmares.	Fault-finding.
Hypochondriasis.	Moralizing.
Somatic complaints.	

Elements of a hypoactive pattern.	
Seclusive (withdrawn, quiet).	Depressed.
Day-dreaming.	Lack of energy (slump in work).
Preoccupied.	Lack of concentration.
Loss of friends.	Fatigue (weariness).
Irritability.	Poor appetite.
Loss of interest (of ambition).	

ever, that the symptoms reported could be divided into two main groups, those characterized by hypofunction and those in which hyperfunction was dominant.

In the first group the patients were reported as seclusive, withdrawn and pre-occupied. They stayed at home a great deal and were given to day-dreaming. Relatives found them irritable, especially on being disturbed. Such patients tended to drop their friends and lost interest in things going on around them. There was considerable lack of energy; fatigue was complained of and the patients could not concentrate adequately.

The second group contained such complaints as worry, uneasiness and apprehension. The patient was frequently reported as tense, sleepless and restless. There was impatience and at times tantrums. Hypochondriacal complaints occurred frequently in this group.

It is of interest to note that the symptoms of hypofunction were present for a considerably longer time before hospitalization than were those of hyperfunction. It would be difficult, however, to state that this meant that hypofunction symptoms appeared earlier in the psychosis than did hyperfunction symptoms. The probability is that the former were the less likely to lead to hospitalization.

While this summarizing is suggestive, it is felt that the separate symptoms should not be lost sight of, since study of particular manifestations affords definite suggestions as to detection of these earliest cases. For instance, the occurrence of hypochondriacal complaints and fatigue should arouse the attention of the private practitioner and the general hospital physician to the necessity of considering mental disorder in patients. Similarly, the occurrence of poor performance is a symptom likely to attract the attention of the psychiatrist engaged in health surveys in industry. These non-specific symptoms persist for periods ranging from weeks to years before the onset of the specific schizophrenic symptoms and were described in 83 of our 100 cases.

Early Specific Schizophrenic Symptoms.

Our next inquiry was as to what symptoms of a clinically recognizable schizophrenic nature first made their appearance, and how long they were present before hospitalization was undertaken.

This is a group of symptoms to which workers in the mental hygiene movement have attempted for a considerable length of time to sensitize the public, and it was felt that a study of the reaction of those in contact with the patient during this stage of his illness would throw interesting light upon the success of the educational efforts which have been made.

A survey showed that these early schizophrenic symptoms are less varied from patient to patient than are the non-specific symptoms. They also can be divided into two major groups. The first group of specific symptoms is largely ideational in nature. The patients complain of being watched and talked about. They may feel that those around them are actively unfriendly, or poisoning or doping them, or are planning violence against them. There may also be ideas of guilt and disgrace and of vindication through identification with the Deity. Included are hallucinations which tend to support these notions. The second group is composed of symptoms indicative of abnormal somatic experiences such as feeling dazed or confused, together with feelings that their bodily organs are not right or that their external environment has lost its feeling of familiarity. Also in this group are symptoms indicative of abnormal somatic responses, screaming or giggling spells, tantrums, or impulsiveness. Included here, too, is refusal to cooperate either in eating, speaking or acting. (Table II.) We

TABLE II.

EARLY SPECIFIC SCHIZOPHRENIC SYMPTOMS.

GROUP I.

Ideational Responses.

Talked about.	Ideas of disgrace.
Watched.	Ideas of redemption.
Doped.	Supporting hallucinations.
Fears of violence.	

GROUP II.

Somatic Experiences.	*Psycho-Somatic Responses.*
Dazed.	Screaming and giggling spells.
Dizzy.	Tantrums.
Lack of feeling of familiarity.	Failure to coöperate in eating, talking or moving.
Odd somatic experiences.	

have felt justified in including some symptoms which are not considered early by the majority of workers (Noyes,[7] Yellowlees,[8] Rosanoff,[9] Mayer-Gross,[10] Henderson [11]) because, while within the group certain symptoms tend to appear rather sooner than others—for instance, complaints of being watched appear first more frequently than do beliefs in intended violence—any one of these early specific symptoms may in individual cases constitute the first recorded evidence of abnormal behavior. It is to be emphasized, moreover, that all these symptoms occurred in our group before hospitalization was considered necessary.

These early specific changes persist for varying periods prior to hospitalization. The duration varies from days to months and very occasionally years.

Contacts of Patient before Hospitalization.

The last two questions, namely: where the patient was and with whom he had contact in the psychotic period preceding hospitalization, were raised for several reasons. It was sought to discover first to what extent the patient was during these early stages of his illness in contact with organized groups to which access could be obtained, if necessary, for the purpose of further mental hygiene education or for the establishment of surveys. We wished also to find out the composition of whatever unorganized groups of which the patient might have been a member. Finally we hoped to discover whether any groups were showing themselves to be already active in the recognition of the early signs of the disorder and particularly in the taking of action.

Our survey showed that particularly in the case of the males the patient often continued work either in school or industry until the specific symptoms were well advanced. In other words, he was in contact with organized groups to which psychiatry is steadily gaining greater access. This was less true in the case of women, and indeed women under the heading of housewives constitute the largest element of the unorganized group. There was considerable disparity in the ability of various groups to recognize the earliest symptoms of illness and a still greater difference in their willingness to take prompt action. Where the patient was living in an organized community such as a C. C. C. camp or college where a good

health survey was maintained, the chances of early recognition and prompt action were at their best. This good record was approximated by the general hospitals to which the patients were in several instances sent, either to check up on vague somatic complaints or to deal with attendant problems of poor appetite and disturbed sleep. The patient's friends and more especially his relatives tended to recognize the illness later than both groups mentioned and to take action considerably later. This is discussed in some detail in connection with the material elicited in answer to the next question which we have asked, namely, the nature of the situation which finally led to the patient's hospitalization.

Cause of Hospitalization.

This was of special interest in so far as it might show how effective have been the efforts which have been made for well over a quarter of a century to promote early hospitalization and to familiarize the public with the early signs of mental illness.

In 26 cases, the patient was sent to the hospital by his relatives mainly because he was recognized as mentally sick. Within this group, however, there are undoubtedly cases of long duration and the patients were sent to the hospital because they had finally become impossible burdens at home. In four cases, the patient's condition was recognized reasonably early and acted upon promptly by the employer, and in one other, by friends. In 14 cases, the patient was sent to a general hospital where his condition was recognized promptly and action taken. In the remaining 55 cases, however, action was taken by relatives only when the patient had become a serious danger to himself and to others—had made homicidal attacks, had attempted or threatened suicide, had refused to eat, or had otherwise shown himself actively anti-social.

These facts all indicate only too clearly that in the majority of cases people are generally unwilling to send their relatives to mental hospitals until it has become impossible to keep them at home. In other words, it is still very much the case that patients do not come to hospital because they are mentally sick but because they are unmanageable. This will be further discussed with the question of how earlier contacts may be established.

Previous Attacks.

Our final inquiry was as to whether previous attacks had occurred out of hospital and how these had been handled. It becomes clear on reflection that a survey of patients who come to hospital suffering from schizophrenia can afford only a limited view of the total instances of the disorder. Undoubtedly many schizophrenic reactions occur in people who are never hospitalized, either because their attacks are transitory or because their symptoms are not of an anti-social nature. Until such time as mental health surveys become considerably more adequate, we can only establish the fact that such attacks do occur by means such as surveying records of patients who were later admitted with full-blown disorders. In our early remitting group, seven patients had shown earlier attacks, and in our chronic group three cases. In all instances the attacks were mild, lasting only a week or so in most cases, and one or two months in a few. In several instances it was only in retrospect that the relatives recognized that these were periods of mental illness. In all cases the patient made a good recovery and was apparently completely well for several years before the onset of the attack for which he was hospitalized.

Detection and Hospitalization.

From the discussion of the phenomenology of early schizophrenia, one passes naturally to a consideration of the problems surrounding its early detection and prompt hospitalization of such patients. At the outset it is necessary to recognize that the methods now employed for many decades to insure early hospitalization have not been sufficient. Efforts to improve standards of care in the physical plant of the hospitals, the promotion of psychiatric teaching in medical schools, and the wide diffusion of mental health information through local and national agencies have accomplished much, but the hard fact remains that the patient still comes to hospital mainly because he must, rarely because he or his relatives seek his treatment.

The policy upon which this long-continued attack has been based rests upon a belief which has not been vindicated. It was recognized that while in the case of physical disease the potential patient himself might be educated both to recognize the early signs

of disorder and to take prompt action, this could not be anticipated in the case of mental disorder. It was hoped, however, that the friends and relatives of the potential patient might be enlightened as to the early signs of mental disorder and that they would, on recognizing the presence of illness, take action. While there is some reason to think from our survey that their emotional relationship with the patient at times stood in the way of their recognizing his abnormality as early as did his employers or other relatively disinterested persons, their failure to recognize the illness is a small matter relative to their failure to take action.

During recent years an alternative or perhaps better a supplementary policy has been evolved. This policy relies on the consent of individuals not presumed to be sick to undergo periodic examination designed, through the detection of very early disorder, to prevent later serious ill health. It is simply an extension of the ideals of preventive medicine. It is not the principle which is new but its application to the field of mental health. These surveys are naturally most readily carried out in organized groups. Among the first were those carried out in colleges. Excellent preliminary reports concerning the technique of these surveys were made by Blanton [12] and by Morrison.[13] These earlier surveys approximate, however, only to a limited degree the survey which now seems to be required. Only those individuals were seen by the psychiatrist whose behavior had attracted the attention of their fellows or of the faculty. This involves relegating the detection of early abnormality to relatively unskilled persons. Later surveys, such as those of Raphael,[14] are based on the personal investigation of each student by the psychiatrist. In this particular survey the investigation was limited to the freshman year. Students found abnormal at this time were followed during their subsequent college career. From this it is clearly only a step to the institution of repeated surveys of the total group. A somewhat similar trend is to be observed in industry.

A question of periodic check of the mental health of unorganized population groups is considerably more difficult, and yet in view of the fact that a considerable part of the population, in particular certain groups of women, do not belong to organized groups to which ready access can be obtained, methods of dealing with this must be considered. Certain experimental attempts to devise such

methods have also been reported. Cohen and Fairbanks [15] have shown how an urban area may be surveyed. They have investigated the mental health of the eastern health district of Baltimore. To accomplish this they brought together the records from all mental hospitals and clinics serving the area, the records of the public school system, and the records of the social service and law enforcement agencies operating in this area. In this way they obtained a picture of the mental health of the district which, while still lacking ideal fineness of detail and sensitivity of reproduction, constitutes a considerable advance over what has hitherto been available. Sjögren [16] has attempted a survey of a rural area. He reports on the mental health of two rural parishes in north Sweden. In this situation he relied chiefly upon the fact that it is by law incumbent upon the head of any family to report the presence of any mentally defective or diseased person in his family group to the rector, who in turn must inscribe the name of that person in the parish register. Sjögren has utilized the records of the hospitals in the parish, the records of the local physicians, and he further interviewed teachers, clergymen, and other responsible persons. Where an inter-related group of families was particularly prone to mental disorder, attempts were made to interview all members of the family complex present in the parishes.

It will be gathered that this more recent policy employed in the detection of early schizophrenia differs from the first essentially in the amount of reliance placed upon the cooperation of relatives of the potential patients. The two policies are, however, identical in the reliance which they place upon the ability of the public to recognize the early signs of mental illness. This is true where the survey method approximates that used by Cohen and Fairbanks in which only those individuals are seen who have attracted the attention of those in the environment. Where the survey is total, *i. e.*, where each individual is interviewed, the probabilities of early detection are increased to the extent to which the psychiatrist is able to pick up signs of disorder during the short period which is usually available. This dependence upon the ability of the unskilled and even the skilled observer to detect the early signs of the disorder from study of the behavior of the individual in the relatively controlled situation of the interview or in his daily

life constitutes a weak point in our attack. The situation may be compared with that obtained when we were attempting to detect mental deficiency without intelligence tests or syphilis without the aid of the Wassermann reaction.

A similar progression from judgment to measurement is, however, also occurring in schizophrenia research. The schizophrenic individual, at least in the later phases of his illness, differs from the normal in certain ways which are susceptible of measurement; among these are the speed and variability of response, the speed being generally less and the variability greater (Shakow and Huston [17]). The schizophrenic is also characterized by his greater difficulty in adjusting to experimental situations. Certain systems such as the autonomic are often specially involved. The responsiveness of this system offers several excellent opportunities for the development of objective criteria (H. Freeman [18]). More recently studies of the brain wave patterns have yielded stimulating leads (Hoagland, Cameron and Rubin [19]). The applicability of these criteria to early cases demands investigation.

Following detection there comes the problem of bringing the patient promptly under treatment. We are at present able to bring the majority of schizophrenic patients into the treatment situation as it is now constituted only after anti-social acts of a serious nature have occurred. Hence it seems highly unlikely that we shall be more successful in attempting the same thing with the very early cases which we hope to be able to detect. How this difficulty is to be met requires considerably more experience and research. The patient's unwillingness to be hospitalized at the early stage of his illness suggests that as a preliminary attack the usual mental hygiene measures—ventilation, adjustment of the environment, and training in alternate reactions—must be attempted. Should this fail, a lead is given by the fact that our survey showed that a fair proportion of our patients were willing to enter a general hospital. If the claims of the more recently introduced therapies can be substantiated, even in part, it would appear to be quite practical to consider carrying out these procedures which usually call for a hospitalization period of little more than six weeks in the majority of cases in psychopathic wards and even in certain instances on the general medical wards.

SUMMARY.

The recent increase of interest in therapy is opening up a new chapter in the attack upon schizophrenia. Whatever may be the eventual evaluation of the more recently introduced therapeutic procedures, they have served to focus our attention upon the fact, long recognized in general medicine, that the results to be obtained from any therapy are dependent not merely upon the nature of that therapy but also upon the recency of the illness. Through having our attention so focused we are forced to appreciate the fact that very early schizophrenia still constitutes a relatively unexplored territory. Entry into this territory calls for new ideas on the social problems involved in bringing the early schizophrenic promptly under treatment, or where the treatment should be carried out and in what it should consist.

These fresh steps can, however, be taken only in the light of more extensive acquaintance with the data, both personal and environmental, presented by the early schizophrenic. Hence this survey in which we have attempted to find out what are the earliest things which the relatives, friends, and others in contact with the subsequent patient notice going wrong with him. We have tried to see in what environment the patient is during these early stages and how the various people around him during this time—his relatives and friends, his employer and his physician—react to his growing abnormality. Finally we have considered the development of certain social trends—the growing acceptance of routine health examinations and the increasing utilization of general hospitals for psychiatric treatment—which may be of immense importance in the satisfactory detection and treatment of early schizophrenia.

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DISCUSSION.

DR. HARRY STACK SULLIVAN (New York, N. Y.).—Rather than discuss the paper, I think I would like to talk on the topic on which I made a report at some length about ten years ago which seemed to me of great significance to psychiatrists who are at all concerned with public health. The idea that we can find a basis for division or classification which will sort out very early in their more serious period of abnormality the people who will become schizophrenic from those who will remain in milder forms of mental disorders is an extremely important point. If we had anything which was at all dependable in this prognostic problem, it should be very clearly defined and very widely publicized amongst psychiatrists and thereafter made a basis of public education. Certainly getting patients to seek help for mental

problems is not nearly as difficult as it may be thought to be if the help that is available comes to be recognized as help. A good deal of the difficulty in getting mental patients to consult psychiatrists or to go to hospitals or clinics for treatment arises from the fact that a good many patients who have for one reason or another come to the attention of these various agencies are not widely believed to have gotten help, but instead various forms of what the relatives, friends and so on, believe discouragement or unfortunate aggravation. As I say, it should not be too difficult to get people to seek mental help if we are sure we can give mental help and know when to do it.

I would be very deeply disturbed if, as is implied by the last speaker, people who show signs of personality disorders, early mental disorder of an indeterminate kind, were to be rushed through treatment with insulin, metrazol and camphor on the chance that they might otherwise have developed schizophrenia. I privately have a suspicion that that might have a distinctly unfavorable effect on the general intelligence level and so on of the community.

What does mean that a person will have schizophrenia which can be detected by the intelligent layman months to years before the schizophrenia appears? In seven and one-half years of exclusive preoccupation with the schizophrenia problem, I was unable to put my finger on anything sufficiently simple and obvious to service this purpose. I do not wish to imply by this that there are not detectible and delineable evidences of impending schizophrenia. I do wish to communicate to you that from my standpoint it is exceedingly difficult to identify and define these criteria. Those that we have heard this morning as the non-specific are either such vague criteria that opinion can differ 100 per cent as to their presence or absence, or they are extremely non-specific and very grossly and extravagantly erroneous evidences of impending schizophrenia. Every obsessional personality will show some of these non-specific phenomena. It is true that people do have obsessional states which pass over into schizophrenia and it is beyond any question true that one of the forms of recovery from schizophrenic illness is the gradual change of its content and its symptoms into those of an obsessional state. In other words, these two conditions have a close but as yet obscure relationship.

We know that a great many, certainly half this audience, certainly half of the more intelligent population, show at times from mild to severe obsessional symptoms. That very fact indicates to you how relatively infrequent the progression from obsessional symptoms to schizophrenia is.

I hope that this conveys to you my feeling of the extreme unwisdom of making the appearance of these evidences of personality disorder a basis for intensive pharmacodynamic shock therapy or anything of that kind.

As to the incipient schizophrenia, as I called it, the beginning of schizophrenia as you may wish to think it, I assure you on the basis of minute study of less than 200 individuals who were communicative all of the time, or part of the time during my contact with them, that there is a group of ideational phenomena, and much less satisfactory, a group of behavior peculiarities which have very high probability of being the early stages of a

schizophrenic disturbance. These are not easily delineable in terms that will work with teachers in school who are certainly the people who see most of these people, or with foremen in shops, or with recreational leaders and fraternal groups, and so on. They are the sort of thing that the patient has learned very early in life to conceal and, therefore, it comes about that in all of these not very intensive personalistic studies, such as the one we have heard, that what are called the symptoms of early schizophrenia, in fact in this paper 26 per cent were admittedly chronic, these symptoms that are described as early schizophrenic symptoms are very well developed schizophrenic symptoms. No one has any question that the patient is schizophrenic, and the point of hygiene and preventive psychiatry has to be pushed back well before the appearance of these full blown schizophrenic disturbances.

What we want to know is when is a tense person developing these tensions with dangerous types of ideation, and by dangerous I mean those that pertain intimately to the structure of schizophrenia as ultimately, we hope, will be delineated.

We want to know for example what to ask when we see certain things and we want the answer to what we ask to split cleanly between the people who are having trouble in living and the people who are in grave risk of serious psychosis.

Let me take one moment to say why. Surely preventive psychiatry ought to help everyone who is having difficulty in living and, therefore, there is no vast problem as to who needs help. Anyone who seems to need help needs help. That is a pretty good rule in medicine, anyway. Why is the incipient schizophrenia so terribly important? Solely and only because about half the patients never show any material improvement and those who are carried to recovery, remission or improvement, take a terribly long time, get themselves littered up with certain traditional handicaps to their further progress, remain open to suspicion of their relatives and so on from thenceforth. For that reason we do need to learn all we can from the life history of the people who have had schizophrenic illnesses and are communicative to us when we go to them for the data. We will get data which can gradually be refined into dependable criteria as to impending schizophrenia. It seems to me that that is one of the most valuable fields of research to which the members of this Association can apply themselves.

Dr. Anita Mary Muhl (San Diego, Calif.).—Dr. Cameron has given us a most interesting paper.

As he has pointed out, the earlier the symptoms are detected, the better chance the patient has of recovery. From my point of view, the most important phases of the study of the problem of schizophrenia is that of the non-specific symptoms, because with the recognition and treatment of these early non-specific symptoms schizophrenia becomes a preventable disorder.

Every physician in general practice, every pediatrician, I should like to say every teacher, should be so familiar with the significance of these non-specific symptoms that there would be little or no delay in beginning a constructive reintegration.

The non-specific symptoms often appear in the elementary grade years and it is because these symptoms do appear so early that I stress the need of the teacher knowing something of this subject.

Let me give you an illustration of an early schizophrenic whose adjustment has become adequate. Twelve years ago, a boy nine years old was sent to me with a request to make an examination and to recommend to what kind of an institution he should be sent.

He was reported as being incorrigible, destructive, untidy in habits, obscene, and violent at times. He was further reported as lacking concentration; of being irritable; and of having had visions. He had failed one grade three times, and the schools flatly refused to keep him because of his abnormal behavior.

On examination, in addition to the above symptoms, he was found to be incoherent and showed marked mannerisms. A study of this boy revealed that instead of being subnormal, he was definitely superior with an I. Q. of 170.

The environmental factors responsible for the development of the symptoms were corrected; a program of retraining and reëducation was instituted, and the boy made slow but steady progress. He finished elementary training in a private school, following which he did remarkably well in junior and senior high.

This year he is graduating with honors from a university. He is liked and respected by teachers and students alike, none of whom have any idea of his earlier maladaptation.

I think it might interest you to know this boy came to me about six months before he was to graduate and said, "I have been specializing in psychology, not that I intend to go into psychiatry, but I intend to specialize in psychology. I feel definitely because I was such a problem and because I had so many difficulties, that I will be able to help other people. I have to present as my term paper "The Study of an Abnormal Child." I thought I could do nothing better than give a case history of myself as that problem. I have come to you to get all of the material which you have and which I know must be of tremendous help to others as well as to myself."

He was not only able to objectify the whole situation, but he has an excellent understanding of all of his earlier difficulties, has entire insight, and he has developed most excellent judgment. Therefore, I stress again that I feel the non-specific symptoms are particularly important, and it is important that all of us should know a great deal about them.

Dr. D. Ewen Cameron (Worcester, Mass.).—I would like to thank the last speaker for her point of view. I am in agreement with her regarding the value of a greater appreciation by the teachers and by the workers in the field of the social sciences of the importance of the early non-specific symptom.

With regard to the first speaker's presentation, I would like to thank him for the point of view he has advanced. I would like to clarify a point in which I apparently have not made myself entirely clear. I don't think that

it is any way feasible to consider at the present time the treatment of persons suffering from early non-specific symptoms by means of pharmacological shock treatments. That is completely impossible. But none the less, those of us who are working in the state hospitals will appreciate the fact that a great deal can be done to get people to come to hospitals earlier in so far as a vast proportion of the schizophrenics who come to the hospital are already quite well advanced in their psychosis and are indeed in many cases so far advanced that what therapeutic resources we do have at the present time are not of much avail.

PROGNOSIS IN SCHIZOPHRENIA.*

A Preliminary Report.†

By JOHN ROMANO, M. D., and FRANKLIN G. EBAUGH, M. D.,
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In the fall of 1937 we began a catamnestic study of 600 patients who had been diagnosed schizophrenia, paranoid conditions and paranoia. These patients had been admitted to the Colorado Psychopathic Hospital in the period from January 1, 1933, through December 31, 1936. The three principal objectives of this study are: (1) The introduction of catamnestic study by means of personal re-examination of all patients discharged from this hospital; (2) the establishment of base line statistics as to the incidence of spontaneous remissions and the character of the various clinical courses in the schizophrenic illness; (3) the acquisition of data which will lead to valid prognostic criteria. In this connection we attempted to study the factors contributing to and determining the onset and course of the illness. The following factors are being considered in some detail: heredity, body habitus and personality matrix, the age and manner of onset, the significant precipitating factors, the character and duration of symptoms, the influence of hospital treatment and the course of the illness. It is hoped that additional information yielded by the study will help to clarify some of the difficult problems involved in schizophrenic diagnosis and classification.

Before presenting a preliminary report of our material it may be wise to preface a few remarks concerning the complexity of the problem. Time will not permit a consideration of the historical development of the prognostic problems in the schizophrenic disorders, since this would involve a review of the entire concept of schizophrenia from its amorphous pre-kræpelinian days to its present highly controversial status.‡ Accordingly, at this time we shall

* Read at the ninety-fourth annual meeting of The American Psychiatric Association, San Francisco, Calif., June 6-10, 1938.

† From the Colorado Psychopathic Hospital.

‡ In this respect the contribution of Adolf Meyer, "The Evolution of the Dementia Præcox Concept," presents the most comprehensive survey in the American and English literature. (Assoc. for Res. in Nerv. and Ment. Dis., 5: 1-15, 1928.)

have to confine our discussion of the pertinent literature to a minimum, noting, however, the paucity of prognostic studies as compared to the vast literature on other aspects of schizophrenia (6, 19, 27). In this respect Braatöy stated:

> Seeking for a more precise answer to this problem, one will once more—as in case of the prognosis in psychiatry as a whole—be disappointed to see how little is known and how few investigations are to be found. On going through the issues of the Index Medicus for some years one meets with an apparently constant stream of works on the therapy in schizophrenia, but little or nothing about the prognosis (4).

Suffice it to say that the problem has been studied here (1, 3, 13, 14, 18, 30, 32a, b, c, 33, 35a, b, c, 36, 37) and abroad (2, 4, 5, 7, 8, 9, 10, 11, 12, 15, 16, 17, 20a, b, c, 21, 22, 23, 28, 29, 31, 39) by a number of investigators. The variables involved seem to be unlimited and conceptual points of view as to the very nature of the illness vary as widely as do methods of study and statistical results.

By means of Table I recently published by H. Pullar Strecker (34) one can readily observe the possible sources of error which have led to confusion. Chief among these may be mentioned the tendency to compare the number of spontaneous remissions as such with the number of cases observed over a long period of time. In the latter we are dealing with the status of the patient as related to the longitudinal course of the illness and not to the acute episode. The study of Mayer-Gross (21), for example, was one which extended 16 or 17 years in length. The results of such a study cannot be compared with the remission figures of Lemke (16) who conducted a catamnestic study of only a few years' duration. This error is most marked when one compares the figures of insulin remissions two years or less in duration with some of the statistical studies concerning illness courses of ten years and longer.

Many studies are of so few patients that they are of little significance in the sense of gaining a quantitative evaluation of prognosis. In Table I the wide disparity between a study of 17 patients and another of 772 patients needs no further comment.

From a diagnostic point of view, the statement of Mayer-Gross that "for the great majority of workers the diagnosis of schizophrenia is first assured by the establishment of a deteriorating course" (21), is not a concept that is unanimously accepted in this

TABLE I.

SPONTANEOUS REMISSION FIGURES IN SCHIZOPHRENIA.*

Author.	Country.	When published.	Cases under review.		Ratio in per cent.				Relevant period under review.	Remarks.
					At home.		At mental hospital.	Died.		
			Total.	Traced.	Well or improved.	Not improved.				
Lemke	Germany (Jena)	1935	132		48	14	29	9	1933–35	....
Faurbye	Norway	1936	72		42	More or less recovered		....	1935	....
Mayer-Gross	Germany (Heidelberg)	1929	328	294	35	3.4	19	42.5	1912–13	....
Lemke	Germany (Jena)	1935	255	126	34	19	27	20	1918–23	Only 49 per cent traced
Otto-Martiensen	Germany (Jena)	1921	527	312	33.7	7.4	21.1	31.4	?	Only 59 per cent traced
Otha	Japan	1936	?	179	29	Complete remission		....	?	....
Dussik	Vienna	1936	94		20	Complete remission†		....	?	....
Arnesen	Norway	1937	815	772	18.5	Recovered		....	1915–28	....
Menzies	Great Britain	1935	17		5.9	Recovered		....	1928–30	....
Stearns	U. S. A.	1912	?	315	5	4.5	64.1	23.8	?	....
Ederle	Germany (Tubingen)	1937	147		3.4	Complete remission		....	1935	....
Total			2460		23.6 (581 cases)					

* Strecker, Pullar H.: Insulin treatment of schizophrenia. J. of Mental Science, 84:146-155, Jan., 1938.
† Average stay in hospital 202 days; insulin remissions, 62 days.

and other countries. The confusion existing in the field of schizophrenic diagnosis can be illustrated best by an enumeration of some of the many terms in use, particularly in Europe: processive and episodic schizophrenia, schizoform, schizophreniform and schizophrenic reactions. A few of these have found their way into American terminology. It may be pointed out further that diagnostic disagreement is not only international but national, as shown by the work of Ödegaard in Norway (25), and even local, as demonstrated by the statistical studies in some Massachusetts State Hospitals during 1925-26 (38).

Keeping these variables in mind, namely length of illness course at the time of re-examinations, number of patients studied and diagnosis, we feel there are two other factors which, with the exception of three studies, have been neglected. We speak of the method of prognostic study and of the criteria for the final forms. With the exception of Mayer-Gross (21), Mauz (20c), and Langfeldt (15), prognostic studies have been conducted by social investigation and questionnaire methods. While these studies may be of value in determining the social fitness of the patient after a certain period of time it is not possible to speak of cure, remission, partial recovery or improvement on the basis of statements made by the family, friends, or even patients. Our experience closely parallels Langfeldt's when he states:

> In the case of the investigation on which this work is based my method has been first to write to the relations of the sick person and inquire as to his or her condition. On subsequently seeing the patient I have not infrequently been confronted with a most astonishing state of affairs. A woman, about whom her mother wrote, "She is quite well, works all day, sings and hums and is good tempered," was to all appearances in this condition when she was subjected to examination shortly afterward. It is true that she sang and hummed all day, washed the floor and carried out various other kinds of work but her mental activity was extremely primitive, and her good temper, humming and singing were expressions of the unconcerned condition of the mentally deficient (15).

The study of Mayer-Gross has been mentioned previously (21). Mauz' monograph is probably one of the most comprehensive in scope yet he neglects to mention the significance of intellectual endowment, the physical state (other than habitus), further treatment, etc. His material is comprised of 1050 cases of schizophrenia which were studied catamnestically during a five year period (1923-

1928). Unfortunately he does not mention the time of onset of illness, the number of patients examined personally, the duration of the illness at the time of re-examination, details as to methods and criteria utilized for the final forms of the illness. He stated:

> We obtained several hundred life histories in which the diseased and healthy periods, the inner and external experiences and influences, dispositions, milieu and social position were taken into consideration. Personal re-examinations, letters and notes from the sick patients, statements by relations served to obtain the necessary material (20c).

More recently, Langfeldt (15) investigated personally the further development of 100 cases of "unmistakable" schizophrenia, with special reference to the factors which might be assumed to be contributory to, and determining for the course and for the actual state of the disease (1936). The 100 cases which were selected had been admitted to the University Psychiatric Clinic at Vinderen, Norway, during the years 1926-1929. In our opinion this study has satisfied more of the criteria demanded in a prognostic study than any of its predecessors. Of great value is the author's attempt to separate the types of schizophrenia, particularly as to those which are processive or certain in their background, onset, symptomatology and course from that great group of atypical reactions sometimes called uncertain, schizoform, schizophreniform or schizophrenic reactions.

At this time in presenting some of the material of our survey we are aware of its present state of incompleteness, but for the purpose of illustrating some of the difficulties encountered as well as comparing questionnaire and examination results we have chosen to present the following. Table II shows the present location, as far as we could determine, of the 600 patients investigated. The most striking data are those of the number of patients in hospitals, the number who were lost, and the number who refused examination. Subtracting from the total number (600), those patients whom it was impossible to have examined,* namely 223 from 600,

* Out of state	47
Out of country	1
Refused	29
Lost	100
Dead	46
	223

TABLE II.

PRESENT LOCATION OF 600 PATIENTS.

	Number.			Per cent.		
	Male.	Female.	Total.	Male.	Female.	Total.
Patients in community:						
Examined	38	60	98	12.63	20.07	16.33
Information (not examined)	42	38	80	13.95	12.71	13.33
Examination refused ...	14	15	29	4.65	5.02	4.83
Patients in hospitals:						
All examined	122	125	247	40.53	41.80	41.17
Lost	62	38	100	20.60	12.71	16.67
Dead	23	23	46	7.64	7.69	7.67
Total	301	299	600	100.00	100.00	100.00

leaves 377 patients. Of 377, 345 were examined personally, that is 57.49 per cent of the total number of patients (600), or 91.51 per cent of those able to have been seen (377).

In a previous communication from this clinic it was noted that the classification of remissions as used by Sakel and Muller were open to considerable variation in usage.

> The diagnosis of "some slight degree of defect" will in many cases depend one one's concept of schizophrenic symptomatology, as will the finding that the emotional reaction is normal. We are in full accord with Bleuler's statement that "in every case the diagnosis of recovery is dependent upon the psychological skill of the examiner and above all on the time the psychiatrist has at his disposal for the observation and examination of the patient. One cannot directly diagnose complete recovery; one assumes it when careful searching reveals no signs of the illness. He who has little time to examine his patients will find many recoveries which another would regard as improvements. . . . . A return to the condition existing before an acute episode is not at all rare, but this cannot be considered recovery if an insidious schizophrenia had already markedly changed the personality of the patient before the acute episode" (26).

Accepting clinical rather than social criteria as the basis for our final formulations we arrived at the following designations. We have classified as remissions those cases in which a careful clinical examination failed to reveal any evidence of schizophrenia. This category satisfies the four principal criteria as formulated by Müller (24) in his complete remission, namely, complete disap-

TABLE II A.

PRESENT LOCATION OF 600 PATIENTS.

	Male.	Female.	Total.
Hospital:			
Colorado hospitals	115	119	234
Out of state hospitals	7	6	13
Total	122	125	247
Examined in community:			
Denver	23	37	60
Colorado other than Denver	15	23	38
Total	38	60	98
Information obtained but patient not examined:			
Colorado	15	17	32
Out of Colorado	26	21	47
Out of country (Porto Rico)	1	0	1
Total	42	38	80
Examination refused:			
Refused by relative or by patient although information given by relative	13	11	24
Refused by relative and no information given.	0	3	3
Refused by patient and no information given..	1	1	2
Total	14	15	29
Lost:			
Colorado	40	21	61
Out of Colorado	21	17	38
Out of country (China)	1	0	1
Total	62	38	100
Dead:			
Natural causes	19	19	38
Suicide	4	4	8
Total	23	23	46
Grand total	301	299	600

pearance of schizophrenic symptoms, with normal affective relationship, full insight (if by this he means the patient's awareness that he has been ill) and ability to return to the normal sphere of work. By marked improvement we mean that all gross schizophrenic symptoms (delusions, hallucinations, odd behavior, dissociation of affect, etc.) have disappeared entirely and that the patient is able to return to work, but that some slight defects can be elicited by careful clinical examination, although in the opinion of the relatives the patients are entirely normal. A third type of "recovery," we call improvement. In these cases gross schizophrenic symptoms were manifested but in much milder forms so that the patients were able to live outside of a hospital, as well as being able to be en-

TABLE III.

PRESENT STATUS OF 345 PATIENTS EXAMINED.

	Number.			Per cent.		
	Male.	Female.	Total.	Male.	Female.	Total.
Remission	0	1	1	0.00	0.54	0.29
Marked improvement	12	13	25	7.50	7.03	7.25
Improvement	27	27	54	16.87	14.59	15.65
No improvement	82	110	192	51.25	59.46	55.65
Worse	39	34	73	24.38	18.38	21.16
Total	160	185	345	100.00	100.00	100.00

gaged in some type of work. Those patients classified as unimproved showed no essential change from their original hospital status, and those considered worse presented evidence of intensification of the primary symptoms in Bleuler's sense. We avoided purposely the use of the term deterioration inasmuch as its present connotation is far too vague.

Table III shows our preliminary figures as to the present clinical status of 345 patients who were examined. These figures are the total results of the schizophrenic patients of all ages, various diagnoses, with illness of a few weeks to many years in duration and who had been in our hospital some time during the four-year period (1933 through 1936). It is interesting to note that in our opinion only one patient fulfilled the criteria of remission or recovery without defect. This is not surprising when one realizes that 247 or 71.59 per cent of the total number of patients examined

(345) are resident in psychiatric hospitals. Table IV again shows the incidence of spontaneous remissions in the total unselected group after subtracting 31 cases who had had some form of prolonged narcosis, artificial pyretotherapy, insulin, metrazol or a

TABLE IV.

PRESENT STATUS OF 314* PATIENTS EXAMINED.

	Number.			Per cent.		
	Male.	Female.	Total.	Male.	Female.	Total.
Remission	0	1	1	0.00	0.60	0.32
Marked improvement	10	12	22	6.90	7.11	7.01
Improvement	25	26	51	17.24	15.38	16.24
No improvement	72	97	169	49.65	57.39	53.82
Worse	38	33	71	26.21	19.52	22.61
Total	145	169	314	100.00	100.00	100.00

* Thirty-one patients who have received some type of sleep, fever or shock treatment were subtracted from total number examined (345).

combination of two or more of these means of therapy in various hospitals. The number of patients who received these forms of treatment is very small and there is no essential change in the figures.

TABLE V.

PRESENT STATUS BY QUESTIONNAIRE METHOD OF 97 PATIENTS WHO WERE NOT EXAMINED.

	Number.			Per cent.		
	Male.	Female.	Total.	Male.	Female.	Total.
Remission	0	0	0	0.00	0.00	0.00
Marked improvement	2	0	2	3.84	0.00	2.06
Improvement	38	32	70	73.08	71.11	72.16
No improvement	12	13	25	23.08	28.89	25.78
Worse	0	0	0	0.00	0.00	0.00
Total	52	45	97	100.00	100.00	100.00

Table V shows the incidence of spontaneous remissions as obtained through questionnaire information on 97 cases. It is interesting to note the marked disagreement between the results of the personal examinations and the questionnaire study. In 61 cases who were examined it was possible to compare the questionnaire,

as filled in by the family, with the personal examination. There was a significant error in 31 or 50.82 per cent of this series. An error was considered significant when it skipped at least one bracket of the final classification. Although this number is comparatively small, we believe it is important to demonstrate the error of questionnaire study and the hazard of accepting social adjustment alone as a criterion of recovery or improvement. We do not wish to disregard or minimize the social factors in the recovery or improvement of the patient, but for the purpose of understanding the course of the illness, we feel it is necessary to have a groundwork of clinical examination.

In a later communication we shall subject our material to a detailed critical analysis hoping primarily to establish more valid prognostic criteria and also to contribute to the clarification of the concepts of the schizophrenic disorders in general.

CONCLUSION.

At the present time the prognosis of the schizophrenic psychoses is very poorly understood. It is apparent that this is due to the heterogeneity of the schizophrenic psychoses; the unreliability of the various catamnestic studies, most of which are based on social criteria; and the lack of reliable prognostic criteria in the individual cases. We have attempted to point out a number of variables that can and should be controlled in order to gain further and clearer insight into the natural course of the schizophrenic disorders.

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DISCUSSION.

DR. ALBERT C. BUCKLEY (Frankford, Philadelphia, Pa.).—Mr. President, it comes within the scope of my experience, and certainly in yours, that when a patient recovered, we have said he was suffering from a manic-depressive psychosis. If he did not recover, we said he was dementia præcox. Our point of view certainly has changed in recent years. We, all of us, know that schizophrenics have remissions and that these remissions vary in their durability and that they are more or less socially adjusted and sometimes able to resume their places in the community for a time.

We have no criteria on which to base a prognosis and our prognosis depends largely on diagnosis, and I think it depends upon the ability of the psychiatrist, who is capable of studying his patients after they leave the hospital; and I think the most important statement in the present paper has been that which is related to the study of the patient following his exit from the hospital.

The dependence upon the reports of friends and relatives, I think, is not to furnish our criteria. It is only in the event that we have the opportunity to study carefully the patient from a psychiatric and psychologic standpoint that we may be able to determine whether or not the patient is restored.

DR. B. C. SCHIELE (Minneapolis, Minn.).—I feel that these studies are exceedingly valuable.

There is little doubt that clinical methods are superior to social methods in the determination of a patient's condition, and perhaps this is a step toward objectivity.

DR. WILLIAM MALAMUD (Iowa City, Iowa).—I just want to say that one possible reason for the small number of recoveries or good remissions in this paper was probably the fact that only half or a little more than half of the patients originally started with were examined. The hardest patients to get at were those who recovered. The easiest to get at were those in the state hospital, and our percentage of 14 is a bit too conservative because the reports we had on the few cases we couldn't reach, were all to the effect that they were getting along well. We couldn't get at them and didn't count them. Many cases were probably largely improvements, if not recoveries.

I wonder whether a period of follow-up—the cases used from 33 to 36, meaning a follow-up of less than five years—I wonder whether that is sufficient to establish the basis of a reliable prognosis.

DR. JOHN ROMANO (closing).—In this preliminary report we were unable to describe adequately our methods of study. Suffice it to say that the hospital records were scrutinized for certain factors which were condensed in abstract forms. Letters of inquiry were sent to those patients not resident in hospitals in an attempt to insure examination appointments. Then followed the planning of routes in urban and rural areas of the state. Our difficulties were many and varied, and the efforts of the social worker in bringing about rapprochement with resistive or indifferent families were of great value.

Dr. Malamud's criticisms are both proper and pertinent. First, in regard to the number of patients lost, the total number of patients seen in the series is little more than half, and I agree with him that many of the lost patients are probably improved in some manner or other. Nevertheless, the fact that they are lost prevents us from knowing their clinical status.

Second, the length of the period following original examination varied from a maximum of five years and a few months to a minimum of one year and a few months. I am in full accord with his point of insisting on five years as a necessary minimum for clinical course statistics. However, we must remember that a study of spontaneous remission figures of one to two years in duration may aid in interpreting the prognostic data of the patients recently discharged after having had some form of pharmacological shock treatment.

One more point: We have run across a number of interesting sociological facts, not the least of which was the discovery of a tremendous population dispersion of our cases. In plotting maps concerning and comparing immediate origin and present location, we found, to our great surprise, that a great number of patients had migrated to California.

DETERMINISM IN PSYCHIATRY AND PSYCHO-ANALYSIS.

By A. A. BRILL, M. D.*

"Determinism has been a subject of controversy for ages. It is the concept which states, first, that our actions can change nothing in the events of life which were firmly established through causal connection, and second, that man is not free to dispose of his own will and to choose between good and evil in his actions." [1]

The controversy of the free will in Western thought and religious beliefs began with the Greeks. The idea of fate as a necessity which made retribution inevitable—nemesis—was particularly stressed by Æschylus and Sophocles. Socrates viewed the problem from the side of knowledge. To him, knowledge constituted virtue, and as the good can be taught, he reasoned that if a man has knowledge of the good, he will *will* to do good. The will is thus determined by the good or the knowledge of the right. Plato distinguished between voluntary and involuntary actions; he accepted the Socratic doctrine of virtue and knowledge, but he did not venture to say whether the will in its effort to will the good is self-determined or whether it is necessitated.

Aristotle maintained that man is motivated in his actions by principles of desires and reason. When the object desired is pleasurable, the reason pursues it; when painful, it avoids it. The *rational* desire for an end is called the will, and is deliberate choice. Hence, "Deliberate choice is a species of will, and is essential to moral action."

The early Christians thought that evil arose from man, who had the freedom to choose between good and evil.[2] St. Augustine [3]

* Read at the ninety-fourth annual meeting of The American Psychiatric Association, San Francisco, California, June 6-10, 1938.

[1] Bleuler: Die Naturwissenschaftlichen Grundlagen der Ethik, Schweizer. Archiv für Neurologie und Psychiatrie, Vol. XXXVIII.

[2] These ideas were taken from Archibald Alexander's very informative work, "Theories of the Will," pp. 7-47.

[3] The Confessions of St. Augustine, translated by Benham, Harvard Classics.

struggled with the idea of the freedom of the will in his scheme of predestination. To quote him: "And I strained to perceive what I now heard, that free will was the cause of our doing ill, and thy just judgment of our suffering ill. But I was not able to discern it. So then, endeavoring to draw my soul's vision out of that deep pit, I was again plunged therein, and endeavoring often I was plunged back as often. But this raised me into thy light, that I knew as well that I had a will, as that I lived: When then I did will or will anything, I was most sure that no other than myself did will and will; and I all but saw that there was the cause of my sin."

The view of complete determinism or predestination as expressed by St. Augustine was held by Thomas Aquinas and all the Catholic teachers, with very few exceptions. The emphasis was naturally laid on the moral or religious aspect of the problem. Milton probably expresses best the gist of the problem as it was understood in his time. In his *Paradise Lost* [4] we read that Satan escaped from Hell and designed to ruin all mankind through the human pair in Paradise. The Lord, thereupon, commissioned Raphael to warn Adam in the following words:

> Happiness in his power left free to will Left to his own free will, his will though free Yet mutable. Whence warn him to beware, He swerve not, too secure: tell him withal His danger, and from whom; etc.

At the end of the 16th and the beginning of the 17th centuries, the problem of Determinism swung from religion to metaphysics and psychology. Thus, Thomas Hobbes states: "Nothing begins from itself. When will arises, the cause is not the will itself, but something else, not in one's own disposing." [5] On the other hand, René Descartes proved the freedom of the will through the fact of consciousness. Locke and Spinoza, both born in 1632, looked at the problem of determinism from a purely psychological aspect.[6] The former believed that the problem was not whether the will was free, but whether the man was free. "A man is free if his actions follow his mental motives—pleasures and pains; he is not free when anything external to him forbids the actions so moved." . . . . "The motive for continuing in the same state or action

[4] Book V.
[5] Bain, Mental and Moral Science, 412.
[6] Bain, l. c. 413-414.

is only the present satisfaction in it; the motive to change is always some uneasiness; nothing setting us upon the change of state, or upon any new action, but some uneasiness! This is the great motive that works on the mind, to put it upon action, which for shortness' sake, we will call "Determining the will." [7]

But Spinoza turned from his teacher, Descartes, and denied the existence of a free will. The idea of determinism pervades Spinoza's whole system of thought. In Prop. XLVIII of his Ethics [8] he states: *"In the mind there is no absolute or free will, but the mind is determined to wish this or that by a cause which has also been determined by another cause, and this last by another cause, and so on to infinity."* Unlike most of his predecessors who attacked the problem from a metaphysical and philosophical angle, Spinoza looked at the problem psychologically. If one disregards the mathematical setting of his work on the nature and origin of the human mind and emotions, one could easily think of reading the works of a modern trained psychiatrist.

We could pursue the subject still further and quote the heated controversies on determinism as expressed by schools of thought and religion, but as these are irrelevant to our discussion, we shall turn to psychiatric literature. Here, we find that although some texts do not speak directly about freedom of will or determinism, their authors, nevertheless, show plainly that they are absolute determinists in their judgment of human behavior. It is interesting to note that some of the earlier psychiatrists give more space to the problem than those of modern times, who evidently take determinism for granted. Thus, Griesinger,[9] speaking of volition, states: "The assumption of absolute liberty, as well as the results that flow from it, is erroneous. The liberty of the individual is always relative, and different men are free in different degrees. Originally the individual is in no respect free," etc. . . . .

Henry Maudsley [10] gives a very interesting chapter on volition, and follows Spinoza in every way. He states: "If we speak psy-

[7] Locke's Essays concerning Human Understanding, p. 146, selected by M. W. Calkins.

[8] The Chief Works of Benedict De Spinoza, translated from the Latin by R. H. M. Elwes. George Bell and Sons, Ltd., London, 1903.

[9] Mental Diseases, New Sydenham Society, p. 44, London, 1867.

[10] The Physiology and Pathology of the Mind, p. 147, D. Appleton & Co., New York, 1867.

chologically, the definite will is the final issue of the process of reflection or deliberation, which a man's life-culture has rendered him capable of, and represents a *conception* of the result with *desire* such as has been determined by the character or reflection."

The psychiatrists who follow him in the 19th and 20th century all hold similar views. I cannot do better than to quote Rosanoff to summarize the views held by our American psychiatrists. He states: "The phenomena of the will like other natural phenomena are subject to natural laws and are determined by antecedents such as heredity, education, various environmental influences, and events immediately preceding a given act under consideration, that is to say, factors for the most part beyond the control of the individual; responsibility, therefore, in the sense of liability to profitless suffering in retribution for wrong doing, does not exist scientifically in any case, sane or insane." . . . . "The scientific point of view presupposes an irrevocable commitment to the concept of determinism in nature, as an article of faith." [11]

Similar statements are found in all standard works on psychiatry, but if I go back to my own experiences with the problem of free will and responsibility, I can say that during my first years as a psychiatrist, whereas I accepted the view of psychic determinism "as an article of faith," I was not quite clear about it. And it was not until I became a Freudian that I gained a clear comprehension of psychic determinism with all its implications. Elsewhere,[12] I said that when I first read Freud's view of overdetermination of the dream and symptom, it recalled to me the views of Spinoza, whose disciple I had been for many years before I heard of psychoanalysis. It was not, however, until after I read Freud's "Psychopathology of Everyday Life" [13] and after analyzing my own faulty acts and dreams, that psychic determinism became clear to me. For Freud demonstrates clinically what Spinoza formulated in his system of thought. Thus, the argument against absolute psychic determinism, which in many people is

[11] Rosanoff: Manual of Psychiatry, 7th edition, p. 51, John Wiley and Sons, Inc., New York, 1938.

[12] Brill: Professor Freud and Psychiatry, Psychoanalytic Review, July 3, 1931.

[13] The Basic Writings of Sigmund Freud, p. 35, The Modern Library, New York, 1938.

based on an intense feeling of conviction that there is a free will, is explained by Freud as follows. "The feeling of conviction exists, but is not incompatible with the belief in determinism. Like all normal feelings it must be justified by something. But, so far as I can observe, it does not manifest itself in weighty and important decisions; on these occasions, one has much more the feeling of a psychic compulsion, and gladly falls back upon it. (Compare Luther's "Here I stand, I cannot do anything else.") [14]

Freud goes on to say that in trivial and indifferent decisions one feels sure that he could just as easily have acted differently, that he acted of his own free will, and without motive. Freud, thus accepts the existence of the feelings of conviction that there is a free will, but calls attention to the fact that there are besides conscious motives also unconscious ones, which supplement the others, and "determinism in the psychic realm is thus carried out uninterruptedly." Anyone acquainted with the works of Freud and his followers knows that the technique of "free association" strives to trace the origin of the symptom, all its determinants, as far back as possible in order to discover its meaning. Let us illustrate this process through the analysis of a simple obsession.

One of my patients, a man of about 40, suffered from the compulsion that Mr. G. stole $40,000. This idea had been obsessing him for many years with fluctuating intensity. Besides knowing such a person rather vaguely, the patient knew that the rest was pure phantasy. Analysis showed the following:

Mr. G's daughter, Sally, had been in primary school with him at the age of 8-9 years. She sat across the aisle from him, and because he had some obscene thought about her, he was afraid that he would be punished by her father.

The idea that G. stole $40,000 gave the following associations: "I cannot say whether I think it or say it, but if I should say it, Sally might hear it and tell her father. Her father would then sue my father, who would spank the stuffings out of me for getting him into trouble. In fact, he might even kill me." [15]

As he grew older, the obsessive phobia became extensively generalized. The fear of uttering this thought then spread to the phobia that he might write it, and he then avoided all books and papers. He even feared that he might scratch the thought with his fingernails. He could not, however, stop thinking of the number *4*. He counted it in his mind, touched things 4 times,

[14] Freud, *l. c.*, 161-162.

[15] These ideas forcibly obtruded themselves on his mind despite the fact that he had not seen Sally for at least 20 years.

and contemplated the multiples of 4. In time, he found himself stepping over cracks in the sidewalk in a series of 4. All these phobias and obsessions resulted in a monophobia, "I feared that if I were alone, I might do those things." Further analysis showed that number 4 was always an obsessive number to the patient. He first imagined that he liked the number *4* because it differed from number 13, an unlucky number. Number 13 is a primary number; number 4 is the smallest number that is not prime. Hence, number 4 must be a lucky number. As he grew older, he had the compulsion to analyze any number that he happened to come across for multiples of four. For example, "number $28 = 7 \times 4$, and it, therefore, has a good quality. Number $36 = 9 \times 4$, but $9 + 4 = 13$; hence, it is not so good." Such examples were multiplied and added *ad infinitum*. Another elaboration of the *4* was that in reading a line with 5 words, he had to go back and read the last 3 words twice, so that the line would be read with 8 words, a multiple of 4. The generalizations and ramifications of this phobia, besides those given here, are too numerous to mention; they really extend *ad infinitum*, as far as the patient's memory could go. Anyone doubting the existence of mental determinism will surely be convinced by analyzing any obsession.

But the psychoanalyst must do more than find the determinants, he must also interpret the symptom to the patient. Here, we can only speak briefly about the origin of this obsessive phobia. Like all similar obsessions, it went back to the pregenital period of the patient's life. He was a spoiled child and had great difficulties in giving up his infantile sexual activities. When he was unable or unwilling to empty his bowels, his mother resorted to the following ceremonial: She counted "1, 2, 3, 4," and cried out "push hard." It was understood that if successful, he would be rewarded; otherwise, he would be punished. At that period of his existence feces was the most valuable object, of which everybody wished to deprive him. There were other very complex associations, which pointed to identifications of Sally with his first love object—feces—and mother, and Mr. G. with his own father. The interpretation of the obsession read: "Father robs or robbed me of my love object."

William A. White, speaking of determinism,[16] states: "Perhaps no better single illustration could be given of the operation of determining factors in the creation of mental products, that would carry more weight, than the evidence that comparative philology offers. If any particular word is traced in its meaning, it will be found that it can be traced further and further back, with varied changes in the form of the word corresponding to changes in the meaning, and that these changes come ultimately to ramify from language to language and extend their roots not only in all directions, but deeply into the languages of long ago and finally, into

[16] Crime and Criminals, p. 25, Farrar and Rinehart, 1933.

dead languages." Dr. White thought that "the significant sequence of events which philology has demonstrated in tracing the origin of words is precisely analogous to the way in which ideas and feelings have been historically traced by the psychoanalysts." [17]

When I read these statements by Dr. White years ago, it struck home because comparative philology had once been one of my fond pets, and as I have never altogether abandoned it, I decided to select number 9 as an example for illustration.

Let us follow the philologists as they trace the number. It is a remarkable fact that in many languages "nine" and "new" are intimately related. They come from the same root.

In Latin novem = 9, and novus = new.
In Italian nove = 9, and nuovo = new.
In French neuf = 9, and nouveau = new.
In German neun = 9, and neu = new.

In some languages both words have the same or almost the same sound. In an Indo-Germanic tongue—Tocharic, spoken in East Turkestan, the same word, *nju,* expresses both 9 and new.

The significant relation between number 9 and *new* soon leads us back to the origin of counting, and as practically everything in man's expression goes back to the human body, it has always been held that the decimal system is based on the number of fingers in both hands. But the etymology of the Indo-Germanic designation of number 8 points to the conclusion that the anatomic structure of the human hand furnished the model not only for the concept 5, but also for the concept 8. For in extension of the hand, the thumb points away from the other four fingers. The image of the four fingertips in both hands furnished the designation of the number 8. That the number 8 Greek, *Okto,* is a direct descendant from the fingertips is shown in the following words: The Greek *Ake* means a point; *Okris* = point, peak, corner, angle; *Akron* = point, height (*Acropolis* = the principal city or capital) *Akribie* = precision, sharpness. In Latin, we have *Acus* = needle. *Acidus* = sour, acid; *Acer* = maple, because the maple leaves are pointed, cut in; *Acutus* = sharp, point, from which we have the French, *acre* and *aigre,* and the Italian *acuto.* The German *Ecke* (end, corner) *Egge,* (harrow) and *Essig* = Vinegar.

[17] *L. c.,* p. 26.

From all these and many other representatives of this clan, we have the Indo-Germanic root *ak* or *ok*, which also means point, and the noun, *Oketon*, which means points, point-like, or a pointed row, and the Greek, dual of *Oketon*, which signifies two rows of points, that is $2\times4=8$. In other words, the ends of the finger of both hands, the fingertips, form the basis of the counting system $2\times4=8$. Now, if one wishes to continue from number 8, he must start anew, hence, number 9=new.[18]

It would be a simple matter to cull deterministic examples from many other fields of science, but the two examples given are quite sufficient for our purpose. For we are not interested here merely in demonstrating determinism, as such, but in its broader implications in psychiatry, to which Bleuler has devoted so much thought, and in its *modus operandi* in psychoanalysis, where it constitutes the most important armamentarium of the treatment.

Spinoza states that "Experience no less clear than reason teaches that men believe themselves to be free, simply because they are conscious of their actions and ignorant of the causes, which determined these actions, and that so-called mental decisions are nothing but the impulses themselves."[19] *Mutatis mutandis*, Spinoza expresses here exactly what Freud has so often repeated. Elsewhere Spinoza states:[20] "Will differs from this or that volition in the same way as whiteness differs from this or that white thing, or humanity from this or that man, so that it is just as impossible to conceive that will is the cause of this or that volition as that humanity is the cause of Peter and Paul. Since, therefore, will is nothing but a thing of reason and cannot be said to be in any way the cause of this or that volition, and since particular volitions need a cause in order to exist, they cannot be said to be free, but are necessarily what they are determined by their causes."

Spinoza said all this in the 17th century, and although philosophers have been fighting over this view ever since and science has perforce accepted the view of determinism, few psychiatrists

[18] This discussion was taken from A. J. Storfer's interesting work, Im Dickicht der Sprace, p. 97, etc., Passer, Wien.

[19] Spinoza: Saemtliche Werke, Pt. III, p. 105, Meiner, Leipzig, 1914.

[20] Correspondence of Spinoza, p. 77, transl. by A. Wolf, The Dial Press, 1927.

have made a real effort to clarify and to apply it to the actual problems of psychiatry. As I said above, Bleuler alone has been occupying himself with the problem in conjunction with his studies of mnemism.[21]

For the benefit of those who are unacquainted with mnemism, I shall give some of its salient points. In 1870 Hering of Vienna delivered a lecture before a scientific society "On Memory as a General Function of Organic Matter." He cited experiments to show that all living matter possesses memory which may exist outside of the psyche and its consciousness. Somewhat later Richard Semon called this form of memory the "Mneme." [22] He stated that this type of memory is found in the species and he ascribed to it the instincts as well as individual and phyletic development. The main thing to remember is that consciousness does not belong to the mneme, for one is aware of consciousness from oneself and by analogy one adjudges one's own inner process to others. Semon called the change produced by the mneme an *Engram* or an imprint, and the subsequent revival of the Engram, or previous stimulus, he designated as *Ekphoria.* Everything experienced plus all the associations are fixed in the Engrams and are later ekphorized in reliving the former experience or the idea of it.

To my knowledge, Bleuler is the only psychiatrist, nay the only scientist, who saw the enormous possibilities of this concept for biology and psychology and has devoted about 20 years to the development of these views. I can only give a brief outline of those views of Bleuler which are pertinent to our discussion.

The concept of identism according to Bleuler assumes that the psyche is a cerebral function. For the psyche depends on the condition of the brain exactly as digestion depends on the digestive apparatus. One does not find anything in the mind which is not dependent on the brain, just like a function of it. Thus, the highest function, the choice between good and evil is among other things

[21] The following concepts were taken from Bleuler's Naturgeschichte der Seele, Die Mneme als Grundlage des Lebens, Die Naturwissenschaftlichen Grundlagen der Ethik, and his other works on the subject, too numerous to mention here.

[22] The Mneme, A Principle of Conservation in the Transformation of Organic Existence.

bound up with the health of a definite part of the brain, and becomes changed through the influence of certain poisons like alcohol. Free will in the sense that a decision can be formed without any cause does not exist in natural science. All living processes, including those of the brain, follow the same strictly causal course as that observed in inanimate nature, which means, that in a definite situation, a definite influence will evoke a very definite reaction. This "determination" was accepted also concerning the psyche long before we became acquainted with the physiology of the brain, because it was noticed that the psychic functions depended on constitution (Anlagen), which one could not himself create and on outer influences, which are also beyond the control of the individual. Nevertheless, we feel that we are free to act as we wish and to decide between good and bad. Bleuler justly maintains that he has never found anyone who could imagine an unmotivated decisions, and he adds that even in mental diseases, where phantasies and impulses seem to originate out of nothing, we find the motives in the unconscious, or in irritations or inhibitions in the deeper parts of the brain.

To clarify the seeming contradiction that, despite the lawful causal connection of psychic functions, we still feel that our will is free, Bleuler gives the following explanation: "The complex of cerebral functions, which we call our psyche, or our ego, contains tendencies (impulses or drives) which lead to action, *e. g.*, the tendency to appease hunger." But this complex of functions—the ego—perceives itself, that is, it is "conscious" of itself, and hence, perceives this tendency and the ensuing acts, as its own acts, which they really are. Thus, one can say "I do what I wish," but he could as well say "I wish what I do." All of which signifies that wishing and doing are the same manifestations of the ego, in different stages. And as Bleuler here mentions Spinoza as having expressed the same mode of thinking, I think it best to quote the philosopher verbatim. Speaking of the freedom of will he states:

"For instance, a stone receives from the impulsion of an external cause, a certain quantity of motion, by virtue of which it continues to move after the impulsion given by the external cause has ceased. The perseverance of the stone in its motion is forced, not because it is necessary, but because it must be defined by the impact of the external cause. What is true of the stone is true of any individual however complicated its nature or varied its functions,

inasmuch as every individual thing is necessarily determined by some external cause to exist and operate in a fixed and determined manner." . . . . "Now further conceive, I beg, that the stone, while continuing in motion, should be capable of thinking and knowing that it is endeavoring, as far as it can, to continue to move. Such a stone, being conscious merely of its own endeavor, and not at all indifferent, would believe itself to be completely free, and would think that it continued in motion solely because of its own wish. This is that human freedom which all boast that they possess, and which consists solely in the fact that men are conscious of their own desire, but are ignorant of the causes whereby that desire has been determined. So the infant believes that it desires milk freely; any angry child thinks he wishes freely vengeance; the timid child thinks that he wishes freely to run away, etc." Spinoza goes on to say that "they all believe that they are acting in accordance with the free decision of their mind, and not that they were carried away by an impulse. But experience abundantly teaches that men can do anything rather than check their desire and that very often when a prey to conflicting emotions, they see the better course and follow the worse; they yet believe themselves to be free because in some cases their desire for a thing is slight and can easily be repressed by the recollecting of something else, which is frequently present in the mind." [23]

Bleuler expresses the same mechanism in our own language by saying that in the ego all the single strivings of the psychic complex are formed into a *resultant,* which we call our "will." The numerous strivings that are stimulated by inner and outer influences are sifted, but in the end the most pervasive asserts itself as this or that resultant, and that is then conceived as the "free will." Why, for example, one has a feeling of sympathy and decides to help his friend, one does not know. As far as one's knowledge is concerned, the causal chain broke off so smoothly behind his wishing that he did not even notice the result. According to his feeling, his wishing started the causal chain, he not only has the feeling of acting freely in accordance with his tendencies, but also that these tendencies depend solely on him. But the objective scientist finds the causes of the origin and existence of the impulses in the inherited after-effects of the ancestry dating back to the beginning of life. Subjectively, it is really only the ego which decides, wills and acts, motivated by its reflections and tendencies, and that in the face of everything else in the world, it begins a causal chain, which is seemingly causeless, "free" from all influences lying external to it. This subjective freedom of will is, therefore, subjectively no illusion. It is an illusion, however, to think that "one

[23] Spinoza's Work, Vol. II, trans. by Elwes. Bell & Sons, London, 1903.

could act differently" under the same condition than one did.[24] Every act is thus determined by the constitutional make-up of the actor and external influences acting on him. Or to express it in Freud's words, man is a product of constitution and fate.

To obviate the hackneyed arguments that believing in determinism means that one is irresponsible for his acts, etc., I will simply say that neither Spinoza, nor Freud, nor Bleuler has ever expressed such ideas. I shall quote Bleuler as spokesman for the others. He states:

> The course of an action in our psyche and the possibility of our will influencing it is precisely the same as the influence of our will on anything of the outer world. If a good deed or an improvement in our impulses is to be attained, the causal chain of this improvement must go through our will, just as I must open the umbrella when it rains if I do not wish to get wet. In other words, as far as the effect of our will on our psyche is concerned, it is exactly the same as its effect on the outer world. We need not be concerned, Bleuler tells us, about the kind of causes that would express themselves in our impulses. *It is essential only that we should will energetically, which must be demanded of the psyche by the determinist as much and as emphatically as by the indeterminist.* To accept such excuses as "I just happen to be that way," "I cannot act differently," "I have such an impulse," or "My father was also that way," is absolutely wrong. In his own experience, Bleuler states, such excuses were regularly given by people of lazy or criminal temperament, who in reality gave no thought to philosophical reflections. Hence, the right answer to people of that sort is, that they really cannot know whether they are really as incapable of doing the right thing, because they have never tried hard enough.[24a]

There is no need of delving deeper into Bleuler's Mnemistic *Wentanschauung,* or philosophy of life, which forms part of the general theory of Identity.[25] I merely wish to touch upon the question of responsibility, in which we are especially interested. Bleuler maintains that the concepts of revenge and atonement no longer fit into the philosophy of life of the natural scientist. In primitive communities they were utilized for the necessary protection against any injury by individuals or collectives. He deplores

[24] Bleuler, *l. c.*, p. 194-195.

[24a] Similar views were recently expressed by the Hollis Professor of Mathematics and Natural Philosophy in Harvard University (*The Intelligent Individual and Society,* by P. W. Bridgman, p. 120. The Macmillan Co., N. Y., 1938).

[25] Those interested may read Bleuler's Mnemistic Biology and Psychology, Journal of Nervous and Mental Diseases, Feb., 1938.

the fact that the feeling of revenge, though perceptibly diminished, still prevails in our courts and often interferes with a calm application of the best measures in a given case. In the modern "treatment" of the criminal, our first consideration should be whether and how he can be cured. Should that be impossible, he must be rendered harmless in order to protect society against him, but this should be done in a manner that will cause the criminal no more harm than necessary. As to justice, which is bound up with the idea of retaliation, a feeling which one observes also in children, dogs, asses, elephants, and other animals. Bleuler considers it grotesque as far as its application to guilt and punishment is concerned, as, *e. g.,* when the severity of the guilt is made equal to a number of months in prison. In civil procedure, however, the word "justice" has the proper meaning.

The determinist's first consideration is not the magnitude of the guilt, which can hardly be measured with necessary certainty even in the simplest cases because one does not know enough of the inner process which leads to the crime, but the magnitude of the harm done. The treatment should be considered qualitatively and quantitatively according to practical needs, for which educational measures are particularly recommended. Neither for practical nor theoretical needs is it necessary to fix responsibility. In place of guilt and responsibility, we should have the concept of causal responsibility, that is, the causal connection of a harmful act with the act of a certain individual. The determinist can make no distinction between the killing of a human being through criminal violence or through the toxines of a tubercle bacillus. In Bleuler's words: "We combat the tubercle bacillus and the criminal as the originators of the killing. We, thereby, destroy the bacillus, and the criminal we 'treat' in accordance with the exact verification of the motives and outer circumstances." The only purpose of the treatment of the criminal is the protection of the community, and there is no sense in being prudish about it, that is, one should not hesitate to act energetically if occasion demands. One should not, however, add more evil to the criminal than is necessary, harsh treatment to even incorrigible prisoners, is brutal and useless. But criminals should not be let loose on the public as long as they are dangerous to society. In place of the vague concept of the magnitude of the guilt, Bleuler puts the concept of dangerousness, which

alone should be the standard for the kind, and duration of the treatment. Bleuler cannot understand why psychiatrists, most of whose views he represents, should be accused of attempting to withdraw the criminal from justice, and granting them license to commit crimes. He is not against capital punishment, which to him is not the highest kind of punishment. Life-long confinement in a cell is much worse. Bleuler cannot understand why we refuse to apply the narcotic sleep as a means of dispatching the criminal into eternity. He thinks we are behind the times of Socrates in this respect.

Yet, like Spinoza, his deterministic predecessor, Bleuler is always realistic. Despite his full conviction of determinism, he, nevertheless, advised the psychiatrist that no matter what his own views are about determinism or free will he must relegate them to the background of his mind when he testifies as an expert and should follow strictly that which the law and judge require of him.[26]

As to the rôle of determinism in psychoanalysis, we have already pointed out that the analytic technique is altogether deterministic in its *modus operandi*. The psychoanalyst uses free associations in order to find the origin of the symptom. The success of the cathartic method was based on bringing to consciousness the repressed ideas with their emotional content, or to allow the patient to *abreact* not only the ideational content, but also the strangulated emotions that formed the symptom. That was the claim made by Breuer and Freud in their first communication.[27] But in order to obtain these results, they at first resorted to hypnosis, which in the light of later knowledge meant that the father commanded the child to tell exactly what happened and, by displaying kindly interest in the situation, prevailed on the child to comply. It was later found that this did not work well, so Freud gave up hypnotism and its offspring "head-pressure" assuming the rôle of passive listener. The technique of free associations is equivalent to a search for all the determinants of the episode in question. In following this process, Freud soon found that the free associations only seldom led directly to the episode; as a rule there was much criss-crossing,

[26] Lehrbuch der Psychiatrie, 6th edition, p. 419, Springer, Berlin, 1937.

[27] Breuer and Freud: Studies in Hysteria, Nervous and Mental Disease Monograph Series No. 61, Nervous and Mental Disease Publishing Co., New York, 1936.

numerous ramifications, bypaths and collateral branches in all directions. To express it in his own words: "Here we find ourselves in a thought-factory, in which, as in *The Weaver's Masterpiece:*

> "The little shuttles to and fro
> Fly, and the threads unnoted flow;
> One throw links up a thousand threads." [28]

Freud gives much thought to multiple or over-determination, as it manifests itself in *condensation* and *displacement,* which he calls the "two craftsmen," chiefly responsible for the structure of the dream. He concludes that displacement is a product of censorship of the endopsychic defense, that is, of repressing forces which shove affects from idea to idea in order to distort the dream. But the same mechanisms are also seen in hysteria, obsessions and paranoia, where, too, ideas are overvalued, condensed, and displaced for specific purposes. In sum, when Freud continued to work with free associations, he learned for the first time the meaning of symptoms, or the manner in which mental streams behave when interfered with, blocked, or entirely obstructed. From the neurotic and psychotic symptoms, he was, so to say, led to the so-called normal, and developed the theories of the dream, faulty everyday acts and slips, sex, wit, and showed the resemblances between the psychic life of the neurotic and the savage. In other words, in tracing determinism, he was led from ontogenesis to phylogenesis, into which he delved as far as he could. And later on when he entered into the field of metapsychology and became absorbed in the deep problem of life and death, he quotes E. Hering to the effect that two kinds of processes course through living matter uninterruptedly, one *anabolic,* assimilatory, the other *katabolic,* disintegrating,[29] and asks: "Shall we venture to recognize in these two directions of the vital processes, the activity of our two instinctive tendencies—the life-instincts, and the death-instincts?" Though, following different paths, Bleuler and Freud meet, as it were, on the Hering biological corner. I merely wish to show that Hering's fruitful views which exerted such potent influence on Bleuler did not escape the notice of Freud.

[28] Freud, *l. c.,* p. 323.

[29] Freud: Beyond the Pleasure Principle, p. 63. Int. Psychoanalytic Publication, London.

If we now think of Stransky's Noöpsyche and Thymopsyche, and let Bleuler define Noöpsyche as the understanding which is based on individual experiences or combinations of ekphorized engrams, and Thymopsyche as the dynamic of the Ergie,[30] *i. e.*, the strivings, the impulses, instincts, will, and attitudinal directions, for all of which Bleuler likes to use the term "affectivity," we would say that Freud directed most of his investigation to the Noöpsyche, although he by no means neglected the affects. Now, the functions of the Ergie are based on phyletic engraphy; as a result of the experiences of all former generations, these drives became moulded for adaptation to the average need of the species, and in their biological significance they correspond to the reflexes of the lower centers. On the other hand, the Noöpsyche, or the intellect is formed on the *tabula rasa,* the blank slate, which we bring along at birth, and consists of the Mnemic acquisition of the individual. The Thymopsyche, or the Ergie, maps out, not only the directing lines of striving and activity, but also the goals of thought; while the Noöpsyche indicates how these goals are to be attained.[31] Bleuler's mnemistic concepts do not change anything in our psychoanalytic therapy; he himself tells us that as long as we follow the depth psychology of Freud, it makes no difference whether we conceive the psyche biologically or as a ghost which does spooky things by itself.[32] All that Bleuler wished to do was to put the psyche on a biological foundation, which I feel that he accomplished in a most convincing and illuminating way. On the other hand, Freud has confined himself to individual behavior and ventured into biology only on special occasions. Both of them, however, are strict determinists in the sense of Spinoza.

In the ultimate analysis, there is very little difference between their views; let us, for example, consider sex, which plays such a part in our therapy. Everybody admits that sex is an instinct. According to Bleuler's mnemistic views, instincts are impulsions which lead to complicated acts, the real (biological) purpose of

[30] Bleuler: Biologische Psychologie, Zeitschrift f. Neurologie und Psychiatrie, p. 562.

[31] Bleuler: Mnemistic Biology and Psychology, Journal of Nervous and Mental Disease, February, 1938.

[32] Bleuler: Biologische Psychologie, p. 570, Zeitschr. für Neurologie u. Psychiatrie.

which is unknown to the individual accomplishing them. The instinct may be considered as an effect of a memory of the species, in other words, instincts are precipitates of mnemistic experiences of former generations. Freud's definition of an instinct seems quite different. He calls it "a tendency innate in living organic matter impelling it towards the reinstatement of an earlier condition, one which it had to abandon under the influence of external disturbing forces." Bleuler tells us of what an instinct consists, but Freud emphasizes what it does. Bleuler's definition contains the element of urge toward change, Freud's seemingly expresses the opposite, viz., the expression of the conservative nature of living beings. Closer examination, however, soon shows that fundamentally they express about the same situation. The sexual instinct fits into both views. Freud constructed his view on the "repetition compulsion" and, to illustrate it, he mentions the behavior of certain fish like the salmon, at spawning time, which make a long and dangerous journey to deposit their spawn seemingly far away from their natural habitat, but, as a matter of fact, they really return to their former homes. He also gives other examples which show that the instinct is a repetition compulsion to reinstate an earlier condition. Bleuler would say that this Ergie is based on mnemic engrams imprinted by many past generations, that it is a phyletic manifestation which unconsciously directs this mating. He undoubtedly follows Freud in considering the hysterical symptom as a symbolization of an unconscious struggle to attain the end aim, but he does not pursue the idea of repetition compulsion as far back as Freud does.

Deterministically, we would say that our treatment consists in teaching our patients to be determinists, by tracing with them their symptoms and at the same time teaching them not to become upset by experiences of any kind but look upon them dispassionately. Or, as Freud would say, give up the phantasy; accept reality and adjust yourself to it. For you know that our patients have all been brought up in an overprotected environment so that they remained in ignorance about the realities of nature. When we trace back the symptom á la Freud and remove the numerous obstructions that blocked the patient's path to maturity, we actually cause the patient to go through, in a fleeting and shortened manner, his or her normal development from childhood to maturity. In a

fashion, the patient goes through a process similar to the one of the embryo in the uterus which repeats in nine months the whole of phylogeny. That accounts for the fact that a phobia-obsessed young woman who is unconsciously striving to fulfill her instinctive mission but consciously rejects it with all her might, becomes perfectly adjusted to it after an analysis and acts in a calm and realistic manner about things which have formerly upset her.

Everyday observations teach us that the great majority of such patients have never had the opportunity to face the real facts of life's struggle. Those who are brought up differently, those who had to cope with reality or were brought up to face it, should occasion demand it, rarely develop very pronounced neuroses. If they are assailed by a new emotional situation, they keep their feet firmly on the ground and solve it in one way or another. Men of action all belong to this type, and to draw from our history, I can cite no better example than our martyred President, Abraham Lincoln. I have no doubt that Lincoln never read or heard of Spinoza, but anyone reading his life and his expressions will perforce be reminded of Spinoza's philosophy. Herndon, his partner and friend, states: "Mr. Lincoln believed that the conditions made the man; he believed that general, universal and eternal laws governed both matter and mind, always and everywhere."

"This philosophy as a whole will account for much of the facts and laws of his splendid life; his charity for men, their feelings, thoughts, willings, and acts sprang out of his philosophy, that conditions made them; his want of malice sprang out of the same. Lincoln neither hated, nor did he love; he never but once or twice eulogized men, nor did he ever curse them." [33] Bear this in mind, please, and listen to the following:

> I have labored carefully, not to mock, lament, or execrate, but to understand human actions; and to this end I have looked upon passions, such as love, hatred, anger, envy, ambition, pity, and the other perturbations of the mind, not in the light of vices of human nature, but as properties, just as pertinent to it, as are heat, cold, storm, thunder and the like to the nature of the atmosphere, which phenomena, though inconvenient, are yet necessary, and have fixed causes, by means of which we endeavor to understand their nature, and the mind has just as much pleasure of viewing them aright as in knowing such things as flatter the senses.

[33] The Hidden Lincoln, by Emanuel Hertz, pp. 141-142, The Viking Press, N. Y.

These thoughts were expressed by the great philosopher Spinoza, but Lincoln, who had little education, came exactly to the same conclusions and the same deterministic philosophy through his own experiences in the great school of stern reality.

To illustrate Lincoln's deterministic philosophy and how he applied it to his everyday acts, I will quote the following anecdote:

Lincoln and his law partner Herndon, jogging along a muddy road in an old buggy through pouring rain, were discussing a point of philosophy—whether there was such a thing as a disinterested, unselfish act. Lincoln said "No"; Herndon argued that there were such acts.

They passed a pig caught in a crack of an old rail fence, squealing for dear life. A little further on, Lincoln, who was driving, stopped the buggy, got out and let the pig loose. When he climbed back in, his feet were muddy, his clothes wet, his hat dripping.

"There now," said Herndon, "in spite of your fine logic you have proved my point. Why get out in the mud and let that silly pig out when he would have wiggled out anyhow?"

"It was a purely selfish act," said Lincoln. "If I hadn't, I would not have slept a wink tonight; his squeal would have echoed in my dreams. He might have wiggled his way out, but I wouldn't have known it. I win the case."

DISCUSSION.

Dr. Clarence O. Cheney (White Plains, N. Y.).—*Mr. Chairman, Members of the Association:* In considering determinism, I am particularly interested in knowing what may have determined Dr. Brill in asking me to take part in this discussion. Dr. Brill has known me for a good many years and he knows as well as I know that his training and interest in philosophy have been quite different from mine. I have been considered a practical-minded person, and when I mention that to Dr. Brill, he says that is akin to simple-mindedness and not far from feeblemindedness. I counter with the reply that I thank God that I can be classified happily perhaps with the feebleminded rather than with the unhappily intellectual philosophers.

But it does not require a philosophical argument to convince me that every natural act is caused by something that has gone before and that thereby willing and thinking are natural events and on a physiological basis as brain function one recognizes, therefore, that a flower grows because of certain preceding events, a stone rolls because of other causative factors, and we are here today because of certain conscious and unconscious determinants, some them pleasant and some of them unpleasant. The catatonic-dementia-præcox patient carries out a so-called impulsive act superficially

without previous cause, but we know now through the important contributions of Freud and others that these apparently psychiatric, apparently undetermined acts in psychiatry are actually determined by factors that, to be sure, may not be definitely ascertained, even under deep analysis. But by analogy with other acts which seem undetermined and which are found actually to have been determined by conscious and unconscious determinants, one is convinced that all of our acts have some previous determinants.

The concept of determinism, as I see it, is not necessarily incompatible with a belief in God. One can be convinced that all of one's acts have causes, but not knowing what the first cause was, or, as is sometimes said, what the ultimate cause was, one may for convenience and perhaps for satisfaction say that God is responsible for things primarily, a name, therefore, and a conceptions that helps to symbolize some power that we see the manifestations of but cannot clearly define. As I see it, therefore, the practical scientific conception of determinism is not necessarily incompatible with a conception of a power that we don't know the exact nature of.

Dr. Brill has covered the matter of responsibility in determinism and one need say nothing further about it. One may pay tribute to Freud for his important, far-reaching contributions in emphasizing the principles of determinism to psychic phenomena. It is difficult to estimate definitely the effect of this conception on the modern development of psychiatry and psychotherapy. I think the great importance of this conception which has been emphasized by Freud is obvious. One also can thank Dr. Brill for bringing this very interesting exposition, both philosophical and practical, before us this morning.

Dr. Adolf Meyer (Baltimore, Md.).—Mr. Chairman, Dr. Brill, I get up to say a word on this presentation because I feel it is well to know why Dr. Brill came to discuss this question. I don't think he came so much with the thought of settling a problem of philosophy, and a problem of great importance to man in general, but to do the act of reverence and attention and fairness to Bleuler, who probably has not been altogether easy to understand, partly on account of the peculiar factor which I want to draw attention to and partly on account of the length at which he has discussed this whole problem and the great involvement of his concepts. Bleuler has evidently, like myself, some of the Swiss conscience and desire to get somewhere, not only to the bottom, but also sometimes to the height of concepts. The difficulties have hit both of us, but I had the privilege of freedom from Central European thought which has involved both Bleuler and Freud in something of a narrowing concept by their limiting themselves with the thought of absolute determinism. Whereas, fortunately to my own constitution, I never had to go into that straightjacket which has involved them both, namely, the idea of the obligatory attention to the self-evident but relatively useless concept of psychophysical parallelism. With psychophysical parallelism and the doctrine of Descartes, they have had the difficulty of one-sided and absolutistic conception of something which fortunately in the land of Dr. Cheney is not obligatory, because from the development of natural science, the study

of living beings has not been separated into the physical and into the mental in that psychophysical parallelism fashion, but has had the privilege of developing, of starting and going on and rising in concepts of biology. That is where Bleuler himself has also arrived and it is one in which Freud has involved himself to a very great extent. We see, then, that with this stopper and adherence to a division which cannot be a division—how can we say that mind and body must be separated or that they are things of that sort? Let's be factual, let's be actual, let's be pluralistic, and have the conviction which American philosophy has from a very early beginning in the eighties stood for and has given us a certain freedom in thinking, and freedom does not mean lack of order. It does not mean lack of determinism but it is a determinism that has a future in it. It goes with time, and wherever there is new time, we cannot say that we can argue with the old-fashioned type of the science which has not attended to the problem of time, has not attended to the problem of chance.

Think of the interesting chapter, I think it was Lecture 2 of the recent volume, the later volume of lectures of Freud, think of what he involves himself in, through an unwillingness to study change which is not lack of order but a definite time of order and an order in which we are not involved any longer in the conception of free will in the absolute or free will with absolute negation.

I don't care very much to refer to attempts, nevertheless, in order to save time I might say that in the Bloomingdale address of, I think, 1921, I took special pains to outline the reasons why this problem of free will is a relative problem and why the problem of determinism is also a relative problem. Philosophy does not give us a statement of new facts. Philosophy is an attempt to keep order in our concepts and the concepts that are based on biology have had the good fortune of being freer than the concept that was based on mechanics and the philosophy of Descartes and an overemphasis on the truism but misinterpreted and misused so-called psychophysical parallelism.

The problem of the philosophy is, as I say, that of keeping our house of concepts in order, and I think there are possibilities to show that concepts are not without foundation and that they are also determined and that they have order. Determinism is essential. Order is a sense for what I call pluralism with consistency, but not dualism.

DR. PAUL SCHILDER (New York, N. Y.).—Freud has theoretically always stated that he thinks there exists a complete determinism in psychic life. However, there is in one of his papers a passage which is something not quite in accordance with his general statement; in the paper on the genesis of female homosexuality, you will find a very interesting statement. He says there we know, when an event has happened, why it has happened and that it had to happen, but we are not sure before it has happened that it will happen, or in some way when we consider the facts after they have happened, we can consider them from the deterministic point of view, but as long as the fact is occurring, as the fact is living, then we are not capable to predict this fact with exactitude. This is the same argument you find in the book of

Bergson, and I really think it is a fundamental argument that there is in spite of all determinism still an inner freedom as long as we are living. The living process is never a process which is completely determined. That does not say we should not strive to the utmost to come to a clear causal connection of facts, but after we have analyzed, then we shall see that there is still something more than the causal sequence, that is, the sequence of life, and that is the full inner freedom.

I do think that such a point of view is also of importance when we handle human beings and ask these human beings that they should themselves set purposes and should look into the future. The future is undetermined and the future contains the concept of purpose, and I do not think we should resign in our practical activities and should hold before our patients the concept of purpose and action into the future. One cannot say that the physics of today are so sure any more that there is a complete determinism; even in the world which is not animated, there is the Heisenberg principle that there is also in the universe not only love but also freedom.

Dr. Ira M. Altshuler (Detroit, Mich.).—Mr. Chairman, Dr. Brill has opened the door to the great temple of determinism. The question, of course, has been ventilated from all angles, and I wish to add only a few points which I feel are very important, not as much from the psychiatric viewpoint of treatment, but from the viewpoint of prophylaxis. We are opening the question of moral responsibility when we speak of determinism, for it is not an idle question to ask whether a man can under a given set of circumstances do otherwise than he does, or whether the future or anyone in the future would be able to do otherwise than he will do. It is peculiar the consciousness of freedom is so real, it is so universal, that such a mind scornfully rejects any implication that he is an automaton.

A scientist who unconditionally accepts determinism in particles accepts fatalism, a dangerous by-product. He willingly imprisons himself in a narrow dungeon which not only locks the door on him as far as investigation is concerned, but also locks the door to his processes of thinking and to his spiritual freedom. The mechanistically predisposed scientist to justify his ideology, usually argues that consciousness of freedom is merely an accompaniment of conscious volition and it is not a proof that action is not determined. Such and similar viewpoints are uncanny; they bring man to an impasse. Such views are more sinister perhaps than Calvinism, for at least in the theology of Calvinism there is some hope that some of us will be the selected ones, but in this deterministic philosophy no one can be saved.

Determinism relieving man of social, moral, ethical responsibilities, makes him a tool of his instincts, precisely the things we are afraid of, for man is not so far removed from his own instincts. It also justifies nations to kill one another and invites society into a state of *laissez faire*. It justifies us doing nothing in the matter of poverty, disease, crime, and social injustice. Determinism also robs us of the precious dream, the dream which is so hovering in man, namely, the immortality of the soul.

I have enjoyed very much the paper by Dr. Brill, and I felt constrained or deterministic to say a few words.

CHAIRMAN ALEXANDER.—Before I ask Dr. Brill to conclude the discussion, I should like to say a few words. It is a very interesting discussion and paper. The psychological determinism, to qualify it, is the working principle which Freud assumed to explain psychological conditioning in patients. He used as the principle that if somebody has a certain psychological condition, is angry, depressed, it can be explained from previous psychological processes. Therefore, one must study the continuity of the psychological development of an individual and try to understand his present condition on the basis of previous psychological conditioning. It is a working principle which however we know cannot be rigidly applied. It is easy to prove this. If we want, for example, to understand somebody's mental status who is enraged, we may find out what happened before he got enraged, such as an insult received; but if we do not happen to know this individual had just consumed one or two highballs before he got enraged so that in his blood there is a certain amount of alcohol concentration, we would come to a very one-sided causal explanation. If he didn't start consuming this alcohol, the same events possibly wouldn't have led to an extreme outbreak of rage.

Psychological determinism has its limitations. Of course, we all agree with Dr. Meyer that this dichotomy of mind and body is an unfortunate one; psychological processes are at the same time the processes in one indivisible organism.

I would say understanding of dreams on a psychological basis is probably the most interesting application of the principle of determinism because most dreams we can understand really from the events of the day before and the previous life experience of the patient, very often in an astonishingly precise manner. We find, for example, that during the ovulation of women, they have very typical dreams. By determining ovulation by physiological or histological methods, using the smear test, we know exactly when the patients ovulates. Comparing the dreams of ovulating women, we see certain similarities; and not even the understanding of the dreams can apply rigidly the psychological determinism, because what she dreams, for example very erotic dreams, or what we call dreams of genital content, are stimulated by the ovulatory cycle which is again not a psychological process in the practical sense at least.

DR. A. A. BRILL (New York, N. Y.).—*Ladies and Gentlemen:* In bringing before you this problem, I was fully aware that I could present only a few fragments of the subject. If time were at my disposal, I could show that Dr. Meyer is mistaken when he thinks that Bleuler separates mind and body and still follows the psychophysical parallelism; just the opposite is true. Dr. Meyer imparted to me only this morning some of his views on the problem, which he formulated some time ago. I regret that I am unable to reproduce them without the risk of misquoting him. Let us hope that Dr. Meyer's views will soon be published.

Bleuler expresses almost the opposite views of what all the discussers, with the exception of Dr. Alexander, impute to him. In his works he says that there is such a thing as an ethical principle that is also inherited from

past generations. To be sure, he does not go to the extremes that Dr. Altshuler assumes. I purposely avoided the old theological "chestnuts" about determinism and free will, which have been discussed for generations. All I wanted to show was that Bleuler makes determinism applicable to our work by deviating from all that nonsense. Everything that was brought up here by the discussers is fully covered by Bleuler in a manner satisfactory even to the deist. What interests me in Dr. Alexander's discussion is what he tells us about ovulating women—that they all have similar dreams. That would seem to corroborate Bleuler's views. Whether the women realize it or not, there are certain unconscious forces always at work, facts which have been fully demonstrated by Bleuler and Freud.

VERBALIZATION AND LANGUAGE SYMBOLS IN PERSONALITY ADJUSTMENT.

By MANDEL SHERMAN, M. D.,
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It is obvious that adjustment to a complex society and to intricate relationships necessitates a complex language orientation. The psychiatrist who studies behavior is able to discover various items of an individual's personality pattern through his language responses. If language can be said to be symbolic representations of an individual's adjustmental reactions, then it follows that many items of a personality pattern may be discovered through an evaluation of language responses. As an example, attitudes, however inadequately measured at present, can be estimated only through language reactions. The emotional reactions of an adult, his interests, his beliefs, his fears and his anxieties can also be investigated through his language reactions, although psychologists are well aware of the difficulty because of distortions, evasions, repressions and inhibitions of which he may not be aware but which nevertheless may influence the examiner's evaluations.

The changes of language which take place in the growth process illustrate the importance of language in personality adjustment. The infant requires little language ability in order to adjust adequately. The infant's requirements are few and are, for the most part, physiologically attained. Although the newborn infant is not a totally helpless individual he nevertheless lives in a highly protected and elemental environment. This does not necessitate active adjustmental efforts.

The progress of the child from the simplest sensori-motor reactions to the development of language and conceptual behavior has been traced in a number of studies. It has been shown that this progress is based upon the gradual change from subcortical dominance, which influences the newborn infant's behavior, to cortical dominance, which determines the integrated language and other symbolic responses of the older child.

The development of language as a symbolic process may be considered, in part, as a complex associative growth developing

subsequent to a given level of a reflexive and sensori-motor activity.[1] In the observation of an infant's development, the various phases of growth—from reflexive to symbolic activity—show a good deal of overlapping. Each phase, however, facilitates the consequent development of another phase. Thus, language may be thought of as the symbolic replacement of earlier, cruder, uneconomical means of adjustment.

Language provides more rapid and accurate responses than the slower, more cumbersome activities which are effective in the early stages of the infant's development. The relationship between sensori-motor adequacy and language development becomes more evident when retarded children are compared with normal or superior children. It has been found that the appearance of language and language symbols follows a given degree of adequacy of the infant's sensori-motor repertoire. When the sensori-motor pattern develops slowly, language is retarded.

Language and the use of language symbols as an index of the adequacy of the adjustmental process are not fully attained with the development of complete cortical function. It is not definitely known, however, how long cortical integration continues to develop, but that it continues beyond the stage when the child first uses language and concepts cannot be denied. There is probably an interdependent and reversible relationship between the process of cortical integration and the increasing tempo of the use of language, and therefore of intellectual and personality adjustment. Thus it can be said that the establishment of one order of mental complexity involving linguistic activity allows the assumption of a higher order. Evidence is at hand as the result of many studies that children living in an environment offering meagre educational and social opportunities show relatively poor language behavior and concomitantly also relatively poor intelligence test performance and meagre patterns of personality.

The complexity of the growth of language in the development of characteristic modes of personality adjustment is illustrated by the multiple relationships which exist between phonetic and gesture language. With increasing age there is a development of independent gestures as well as explanatory and auxiliary ges-

[1] M. Sherman, I. Sherman, and C. D. Flory, Infant behavior, Comparative psychology monographs, 1935, 12, pp. 107.

tures.[2] Trait development parallels the increasing complexity of the social relationships in which the child finds himself. Thus his language varies with his growth and evolves as the pattern of personality becomes more complex and systematized.

Attempts have been made to compare the phylogenetic with the ontogenetic aspects of language development in the description of the linguistic growth of the infant and child. Thus the theory that language developed in social situations as a tool for social action and co-operation has been compared with the development of language in the child as he is forced to use it increasingly with the development of social relationships. Some observers state that the development of the adjustmental processes of a child are functionally similar to the development of language of primitive man. Allport [3] believes, for example, that as language originated, sounds became symbols and were utilized as a refined form of control. As in "infant" man, the human infant begins his language activity by gestures, involving emotional reactions, pointing and descriptive movements. Vocal expression meanwhile develops. The speech sounds themselves act as further stimuli to the development of more complex language. In the infant the sensory stimulation accompanying speech thus, perhaps, becomes a stimulus to further language development and to the development of language symbols. The control of one's own behavior through language is followed by control of the behavior of others. Barnes [4] also believes that the verbal response to a stimulus becomes in turn a stimulus to further responses. The first language reactions are, according to Barnes, reflexive and physical. Thus he assumes that the organic drives of the infant create the original language reactions. The initial language responses in turn create the background for more complex linguistic activity.

Among the functions of language Ogden and Richards stress the attitudinal and emotional relationships between the speaker and his audience.[5] They state that psychologists, and especially

[2] H. Maesse, Ein Beitrag zur Frage der Gebärdeeinteilung, Deutsche Sonderschule, 1937, 4, 336-344.

[3] Floyd H. Allport, Social psychology, 1924, New York, Houghton Mifflin Co., 169-199.

[4] Walter Barnes, Language as behavior, The elementary English review, 1930, 7, 241-245; 1931, 8, 44-46.

[5] C. K. Ogden and I. A. Richards, The meaning of meaning, 1927, New York, Harcourt, Brace and Company, 209-250.

linguists, have overlooked the importance of the effect of attitudes and emotions upon the nature of the words and symbols a person employs. The authors state, "Besides symbolizing a reference, our words are signs of emotions, attitudes, moods, the temper, interest or set of the mind in which the references occur. They are signs in this fashion because they are grouped with these attitudes and interests in certain looser and tighter contexts." The attitudinal and emotional influences upon language forms may be modified by various concomitant activities, such as gestures and mannerisms.

Other observers believe that even the first reactions of an infant in his adjustment to objects involve the use of language in attitudinal as well as other forms of adjustment.[6] Some psychologists believe, however, that the first expression of language results from the cognitive process in response to objects and events. When the emotional expression of language evolves the cognitive elements have already been developed to the point where they can be inhibited. The angry tone of voice, for example, which supposedly develops after language first makes its appearance indicates the use of language for emotional adjustment and for the emotional control of others. The emotional function of language thus appears after the imitative period, that is, after the child understands the meaning of the words he uses apart from the objectives with which they were originally associated.[7]

The previous statement that the language of a child develops as a symbolic substitute for original reflexive and sensori-motor reactions may be compared with Watson's theory of language de-

[6] Wundt (quoted by Erwin A. Esper, Language, A handbook of social psychology, Edited by Carl Murchison, 1935, Worcester, Clark University Press, 417-460) believed that human infants in their first reactions express affective processes which accompany simple sensory experiences. These expressive movements become associated with other more complex experiences and thus create a feeling tone. The further development from this original emotional expression forms the basis for the arousal of gesture language. The primary function of speech for Wundt is therefore not communication but expression of ideas. Thus the first expressive movements indicate "feelings," then ideational content develops, then associative interconnections, and finally language in its ordinary volitional functions.

[7] For a brief review of the psychological theories of the function of language see Donald McGranahan, The psychology of language, Psychological Bulletin, 1936, 33, 178-216.

velopment.[8] According to Watson, mental activity is in part merely implicit vocal activity. When the child begins to verbalize his manual reactions word organization soon becomes dominant. The inference is that some sort of parallelism exists, but the skeletal and visceral reactions are primary. Thus language is adjustmental and symbolic only in the sense of the verbalization of physiological reactions or implicit or anticipatory reactions.

The relationship between motor activity and language adjustment has been investigated experimentally by Luria.[9] According to Luria, diffuse, impulsive behavior is seen in infants and also in adults who react emotionally. Organized behavior is characteristic of normal adults. Impulses arising from external stimulation do not immediately influence the motor area but, according to Luria, are elaborated behind a "functonal barrier" so that the final acts are definite, organized, and directed. The elaboration before motor innervation takes place gives normal behavior an organized form. The organization of behavior is best illustrated in language which functions not only for the purpose of self-control but also for the control of others. The organization of behavior (in language) occurs only after the development of a functional barrier to immediate motor action.

It is not the purpose of this paper to trace the development of words, phrases and sentences. Only a general statement will be made regarding the function of speech in the psychological adaptation of the child. The imitative and associative use of words which first occurs is sufficient to adapt the child on the basis of his physical needs. As language develops from the use of the single, isolated word denoting objects, to the use of phrases which imply activity, the child is able to socialize his behavior and express psychological relationships. With the rapid addition to his vocabulary, his social and psychological relationships widen rapidly and the child is thus able to relate himself not only to immediate but also to future events and conditions. There is thus an interdependent relationship between his language development and the growth of his personality.

[8] John B. Watson, The unverbalized in human behavior, Psychological Review, 1924, 31, 273-280.

[9] A. R. Luria, The nature of human conflicts, Translated from the Russian by W. Horsley Gant, 1932, New York, Liveright, Inc., pp. 431.

An excellent illustration of the relationship between the development of language and comprehension and the changes in personality adaptation is seen in the observations of Goodenough [10] upon the character of temper tantrums at different ages. At first temper tantrums involve crying, screaming, kicking and stamping. As language becomes more prominent, verbal rejoinders become more frequent. Thus verbal refusal, threatening, calling names, arguing and insisting, partly replace the earlier physical reactions of the temper tantrums. Anger thereafter is expressed through language rather than through overt physical activity.

McCarthy [11] in a study of 31 children found that their language responses differed according to the situations in which they found themselves. For example, verbal responses were less restrained when they were in free play groups than when talking to adults. Emotionally toned verbal responses were also more frequent in free play situations.

Of the many studies, those by Piaget [12] deal most closely with the relationship between language and personality. Piaget believes that there are three well-defined periods in the development of thought and language of the child. Up to the age of six the child is supposed to be pre-logical in his thinking, characterized by finalism and artificialism. The child is unable symbolically to assume the position of another. At six years of age the child is extremely egocentric. In two of the children which Piaget studied he found egocentric language in nearly half of their total spontaneous verbalizations. Repetition of words for the pleasure of talking is characteristic of this period. The monologue usually accompanies action. At this period the dual or collective monologue is observed, although the listener is expected neither to attend nor to understand.

Between the ages of six and eight there is a gradual waning of the egocentric characteristics. The child begins to exchange

[10] Florence L. Goodenough, Anger in young children, 1931, Minneapolis, University of Minnesota Press, pp. 278.

[11] Dorothea McCarthy, A comparison of children's language in different situations and its relation to personality traits, Journal of genetic psychology, 1929, 36, 583-591.

[12] Jean Piaget, The language and thought of the child, 1926, New York, Harcourt Brace & Company, pp. 238.

thoughts with others and the interchange of ideas influences the child to adapt the point of view of the hearer. Piaget classified the thought processes into two parts, the direct-intelligent thought and the indirect-autistic thought. He defined direct thought as that which is adapted to reality when the child tries to influence it, and this type can be communicated by language. In autistic or subconscious thought the problems are not present in consciousness and are not adapted to reality. Other observers have also shown that the phantasies of young children are probably closely related to autistic thinking. During childhood, however, autistic thinking is only partially represented and language is usually employed as substitutive activity. An example of this is found in many forms of make-believe play during which the young child employs language to define his compensatory desires.[13]

The influence of the development of comprehensive language upon personality and upon social relationships is described in detail by Piaget. At first conversation merely reenforces overt activity. Language and activity are therefore at first only indirectly related. Later language is utilized as a substitute for overt activities and the character of the conversation in many instances becomes dissociated from the activities of the moment. Language representing independent thought becomes the medium through which a child consciously and unconsciously attempts to differentiate himself from others. Quarreling, for example, which at first manifests itself on a physical basis, gradually becomes definite intellectual argument. Piaget believes that the development of the quarreling period indicates the child's expression of the need of making himself understood. At the four-year-old level, for example, Piaget finds quarrels essentially without words. Later words and actions are used together, and later still, words without overt action. Fisher[14] also showed that although the preschool child uses egocentric speech he is also sociable. As the child grows older he talks less about the objects with which he is working or with which he is associated and more about people and abstract relationships.

[13] See Edward S. Robinson, The compensatory function of make-believe play, Psychological review, 1920, 27, 429-449.

[14] M. S. Fisher, Language patterns of preschool children, 1934, New York, Teachers' College, Columbia University, pp. 88.

The report of Piaget has not gone unchallenged. Johnson and Josey,[15] for example, attempted to duplicate Piaget's experiments. They reported that six-year-olds were predominantly socially-minded and not egocentric. McCarthy[16] also found a smaller proportion of egocentric language. There may be several reasons for these differences in the findings. For example, Piaget's observations were made during free play when the children were probably talking about their activities. Also, Piaget reported his observations of only two children.

Other difficulties also arise in making conclusions regarding the relationship between language and specific personality adjustments. It is difficult, for example, to define egocentricity precisely. Some observers state that egocentricity as a dominant personality reaction is found as frequently in adults as in six-year-old children. The method of expressing egocentric traits changes, however, with increasing age. Charlotte Buhler[17] reports, for example, that boasting reaches its peak between the ages of 10 and 12. Twenty-five per cent of the children between those ages were boasters, whereas only 12 per cent were found between the ages of 12 and 14.

Psychologists have pointed out that individual symbols, innuendos and other forms of expression take the place in the adolescent and adult of the direct language of the young child. Thus, as the individual begins to understand the meaning of his desires and of the effect of his language reactions upon others he tends to use language symbols more frequently. He also tends to cloak his meanings in vague terms or symbols partly in his attempt to experiment with his hearers before he expresses himself more fully.

The use of language for the maintenance of one's personality integrity has been shown in many studies. Hargan[18] illustrated

[15] E. C. Johnson and C. C. Josey, A note on the development of thought forms of children as described by Piaget, Journal of abnormal and social psychology, 1931, 26, 338-339.

[16] Dorothea McCarthy, The language development of the preschool child, 1929, Minneapolis, University of Minnesota Press, pp. 174.

[17] Charlotte Buhler, Social behavior of children, A handbook of child psychology, edited by Carl Murchison, 1933, Worcester, Clark University Press, p. 397.

[18] James Hargan, The psychology of prison language, Journal of abnormal and social psychology, 1935, 30, 359-365.

this function of language in his study of prisoners. He believes that the social rebellion of the prisoner is as effective in his language responses as in his other behavior. By scorning the conventional vocabulary he probably achieves a degree of emotional satisfaction similar to that achieved by the child in his egocentric speech. The prisoner supposedly neutralizes his feelings of inferiority and perhaps guilt, and evades the fact that he obtains no recognition from society. His conversations may serve to give him a sense of class solidarity and thus he may obtain comfort through his membership in his group. He uses the metaphor constantly and he has a tendency to think in emotional or imaginative terms rather than literally. The metaphor as an important form of expression is claimed by Werner to have arisen out of a spirit of taboo.[19] Thus those groups who have no taboos consequently have no metaphors in their language.

In the case of prisoners there was a constant attempt either to express a strong emotion or to minimize or avoid it altogether. The use of substitute words, that is, the typical prisoner's symbols, may be for the purpose of emotionalizing his responses or may be merely indicative of class language. Thus the machine gun is referred to as a typewriter, the bomb as a pineapple, a year's sentence as a book, and so on. Hargan believes that the prisoner is able to "soften" unpleasant reality to something which is bearable to him through the use of euphonistic, often humorous understatement. According to Hargan, therefore, the escape mechanism is an important characteristic of the prisoner's language. The following example of prison conversation reported by Hargan is used to illustrate this.

> As soon as I got out of the bird cage (cell) this morning, I went to the mess hall and tanked up on mud (coffee) and bread. Then at noon we had rubber heels (slices of meat loaf) with some fish eyes (tapioca) after. Sundays we get mountain goat (mutton) or sometimes leather (beef). If I don't get a hooker (warrant for immediate rearrest) I'll soon be out of this can (prison) with at least a pocket full of rattles (silver money).

In regard to the use of metaphors, other observers believe that they arise from lack of speech forms to express specific desires and from the need for drastic characterizations. As an example, in referring to a person as a "snake," the subject expresses an at-

[19] H. Werner, quoted by McGranahan.

titude toward and a judgment of the person in a dramatic and emotionally satisfying manner.

The use of class language as attempts to maintain personality integrity is also seen in language (speech?) forms used by various professional groups. The physician, for instance, is frequently very careful to express himself in medical language although he may be able to express the same idea in ordinary language. For the engineer, the lawyer and other professional groups professional language and language symbols may partly function as a way of differentiating themselves from other persons.

The use of language for prestige can also be seen in many other ways. The coining of phrases for effective prestige, for example, is common in political activity. It is also relatively common in scientific writing. In a recent book new and supposedly effective phrases such as "cadence of personality" and "tempo of emotions" were used with great frequency. Among non-professional groups, language forms may serve to illustrate a person's knowledge or sophistication. At various times adolescents and adults use various fashionable phrases. Consider, for example, the wave of enthusiasm with which people learned and used such phrases as "so's your old man," "twenty-three, skidoo," "for crying out loud," and "oke doke."

Profanity as an example of a form of emotional expression has also been cited by various observers. According to some of them, swearing serves to produce awe or fear in the hearer and thus removes the source of irritation. The words which an individual uses for his audience thus supposedly not only serves to shock them but also give the user emotional satisfaction. Adolescents frequently derive great satisfaction from the use of profane words. In many instances the use of profanity symbolizes masculinity regarding which many adolescents are in conflict. Through the use of profanity some adolescents thus symbolically attain an adult status and may compensate for their feeling of inferiority. Conflicts regarding morality which prevent an individual from expressing his desires may also result in the use of profanity and the telling of "shady" or "dirty" stories.

Psychiatrists have noted that given language and language symbols are employed by many persons as an avoidance or justification of behavior. Argumentativeness is probably employed uncon-

sciously by some persons as an attempt to avoid scrutiny of themselves by attacking other persons verbally. By involving themselves in controversy they are able to escape both self-scrutiny and scrutiny from others. Another example of the method of self-justification is the frequent imaginary arguments some persons have with some one whom they dislike or who has given them a great deal of insecurity. It is not uncommon to have an imaginary argument with one's employer with highly emotionally toned subvocal activity. Of course the person nearly always wins the argument. The resulting verbal victory functions partly as a retribution to the unfair and unpleasant employer and also as a justification for one's beliefs and behavior.

Assuming that mental activity is at least in part a language process, it is obvious that much may be learned about the personality of an individual through his language responses. Thus psychiatrists make close observations of the content and affective elements of the language of their patients. "Slips of the tongue" have long been recognized as important clues to the real beliefs and attitudes of an individual which he ordinarily inhibits in his everyday behavior. Language responses may be inhibited or distorted when given memories are repressed because of past unpleasant associations. Thus it is necessary to place the subject in a situation which will lessen his inhibitions and which will decrease his attempts to guard his language. The free association method is thus frequently employed in order to obtain information regarding experiences and events the memory of which has been repressed or inhibited. In addition, the patient is thus aided in freeing himself of his anxieties through the verbalization of his unpleasant and painful memories. This is especially true when the patient utilizes emotionally toned language in his free association responses. The psychiatrist also obtains many clues not only from the content of the responses, but also from the various emphases, repetitions and emotionally toned words or phrases. As an example, repeated and emphatic statements by a child of his esteem and affection for his brother may mean the very opposite attitude. His emphasis upon his affection for his brother may be his way of avoiding a sense of guilt. The person who repeats statements regarding a given belief may have opposite beliefs. In direct association tests blocking upon given words may be important

indicators of an individual's problems and conflicts. The results frequently obtained upon such tests as the Kent-Rosanoff association test show this mechanism clearly.

Psychiatrists have also been able to obtain many important clues by observing the regressive language of their patients. By the use of language symbolic of a less mature age, individuals may be able to obtain attention from their families and friends and at the same time avoid realistic problems which they are unable to face. The hysterical individual's language responses are especially significant for the study of regression. Hysteria is commonly considered to be in part a regression to an earlier, less mature form of behavior. It is thus a symbolic return to a childhood level of adjustment as a method of escape from adult responsibilities and difficulties. It has been noted in many cases that the language of the hysterical patient regresses to the "childhood" level the patient assumes.[20]

Of the many speech and language disorders, stammering has been discussed most frequently in the literature. Until recently stammering was believed to be a speech disturbance. Some observers ascribed stammering to a physical disorder of the vocal cords, whereas others believed that stammering was due to disturbances in the nervous mechanism controlling the speech mechanism. In recent years, however, evidence has been brought forth to show that stammering is in major part a psychological disorder involving not only speech as a mechanical process but also language as a distortion of language symbols. Even those observers who still maintain that stammering is a speech disorder now believe that psychological problems also have an important rôle.

Travis,[21] for example, believes that incoordination of functional dominance between the cerebral hemispheres accounts for stammering. Any disturbance in the integrative activity of the two hemispheres, so that they function relatively independently, results in speech and language pathology. Travis does not deny, however, the importance of environmental conditions and emotional problems in their influence upon the degree of stammering. The emotional

[20] See M. Sherman and Blake Crider, Verification of emotional regression by tests, American journal of psychiatry, 1933, 89, 1085-1094.

[21] Lee Edward Travis, Speech pathology, A handbook of child psychology, edited by Carl Murchison, 1933, Worcester, Clark University Press, 650-698.

interference with speech does not produce a persistent inhibition, as is the case in some types of mutism. The interference produces temporary blocking so that there is alternate inhibition and facilitation. These blockings in turn produce secondary emotional states and attitudes which cause further distortions.

The emotional factor as a major cause of stuttering has been pointed out directly or by implication by a number of psychologists. Fletcher,[22] for example, in an excellent review of the various theories and therapies of stammering, concludes that the emotional backgrounds of the stammerer are the most important of the many factors involved. Others have also shown that stammering is not a disorder of the speech mechanism. This is illustrated by the fact that stammerers are able to speak perfectly on many occasions, but stammer in varying degrees depending upon the emotional implications of given situations.

Some psychiatrists believe that stammering is a language disorder resulting from a neurotic condition. Coriat[23] is one of the strongest proponents of this belief. Although Coriat goes beyond his data in developing his theory of stammering, he has, nevertheless, well shown that the stammerer must be considered a psychoneurotic individual. The dominant overt manifestations of this psychoneurosis is a language disturbance externalized in speech pathology. Coriat believes that one of the most important factors in the causation of stammering is the attempt by the individual to repress from consciousness given traits of thought or emotion. The language repression is supposedly due to the individual's fear that he will betray himself. Thus the difficulties inherent in the desire to speak and the drive to repress result in stammering. Other psychiatrists believe that the fear of saying given words which are tabooed may result in a stammering process. The difficulty is increased by the persistent desire to speak those words. The stammering finally becomes habitual and carries over into words which were not originally related to the tabooed words.

The neurotic and conflict accompaniments of stammering have been noted by a number of other observers. The question arises

[22] John M. Fletcher, The problem of stuttering, 1928, New York, Longmans, Green & Company, pp. 362.

[23] Isador H. Coriat, Stammering, a psychoanalytic interpretation, 1927, New York, Nervous and Mental Disease Publishing Co., pp. 68.

whether the neurotic condition is the result of the stammering or whether, as some psychiatrists state, the psychoneurosis is the basis of the stammering. Meltzer [24] has shown, for example, that many stammerers are highly talkative. Meltzer compared a group of 50 stuttering children with a control group of 50 normal children in their responses to the 10 ink blots which compose the Rorschach personality test. The number of words used by a child in responding to the ink blots was taken as a measure of his talkativeness. Supposedly, the stimuli evoked free association and the extent of the responses was accepted as a measure of the tendency to talkativeness. The results showed that stutterers talked a great deal more than non-stutterers. The responses of the stuttering children showed a greater productivity and a larger number of clarifying phrases. The non-stuttering children gave more direct responses, indicative of effective adaptability. Meltzer makes no specific explanation of the differences between the stutterer and non-stutterer. He mentions, however, the possibility that the stutterer attempts to compensate for his stuttering by being more than normally talkative. Meltzer also mentions the possibility that the talkativeness may be due to a trial and error process resulting in the use of many more words than would ordinarily be employed.

Whether specific conflicts are at the basis of stammering or act as additional barriers to normal speech is not known. It is known, however, that stammerers frequently have great difficulty in talking about problems with which they are emotionally involved. Many cases have been reported in which very little stammering was observed except when the patients were asked questions relating to their emotional problems. The compulsive (emotional) element of stammering is illustrated by the inability of some stammerers to stammer voluntarily. In the Dunlap [25] method of negative practice, for instance, the stammerer is asked to stammer voluntarily. In the majority of instances the stammerer must "learn" to stammer because he is unable to reproduce his stammering under therapeutic conditions.

[24] H. Meltzer, Talkativeness in stuttering and non-stuttering children, The journal of genetic psychology, 1935, 46, 371-390.

[25] Knight Dunlap, Habits, their making and unmaking, 1932, New York, Liveright, Inc., 194-210.

Disturbances of symbolic representation of a more serious nature than in stammering are shown by the aphasic patient. Although aphasia is due to an organic disturbance of the brain, the nature of the language distortion may be affected by the intelligence, education and personality of the patient.

Various classifications of aphasic language disturbances have been made. Those by Head [26] have been quoted most often. Head classified aphasias into groups which show verbal, syntactical, nominal and semantic defects. In the verbal type the patient is unable to form words correctly. There may be slurring and shortening of words, although the patient may recognize his errors. In syntactical aphasia the patient cannot connect correctly the various words, and to the listener the language is jargon. In nominal aphasia there is inability to use names of objects and to recognize the meaning of words. In semantic aphasia there is a failure to recognize the significance of words and phrases. Individual words may be separately recognized but their relative meaning is not understood. Thus the significance of even a simple story may not be understood, and in conversation there is great difficulty in making a point.

Some writers are of the opinion that temporary disturbances of language may be due to processes similar to those basic in the aphasias. Thus it is supposed that psychological mechanisms may cause dissociations similar to those caused by organic disorders.

Mention has been made that the psychological processes of adults may be studied effectively through the medium of language.[27] Thus, the language distortions of the abnormal individual are important not only as expressions of mental disorder but also in some instances as indicators of the underlying problems. Kraepelin stated that the supposedly meaningless repetitions of the psychotic patient may be compensatory reassurances of something he does not totally accept. For example, the verbigerations which are fre-

[26] Henry Head, Aphasia and kindred disorders of speech, 1926, Cambridge, Cambridge University Press, 2 volumes, pp. 549 and pp. 426.

[27] In recent years a number of writers have attempted to develop a systematic theory of the relationship between language and mental processes. See Alfred Korzybski, Science and sanity, 1933, Lancaster, The Science Press, and D. G. Campbell, General semantics, American journal of psychiatry, 1937, 93, 789-807.

quently observed in psychotic persons are, according to Kraepelin, not merely speech perseverations but are supposedly the result of a negative exclusion of new ideas. In other words verbigeration may be a method of controlling ideas which are unpleasant to the individual.

Zipf [28] emphasized the differences in the speech and language of different types of psychotics. The manic patient, for instance, is extrovertive in the sense that he makes a definite effort to convey his impressions to the listeners. He is very active in his speech and he shows a great deal of flightiness in his ideas. To the schizophrenic, on the other hand, the auditor is supposedly not welcome and the character of the language shuts the patient off from society. Thus the mentally abnormal person frequently uses neologisms, that is, words meaningless to the hearer.

According to some writers the disturbances of the language of the schizophrenic patient are due to a regression to an earlier level of behavior. The emotional regression to a childhood level conflicts with the ability of the patient to use language and thus supposedly accounts for his confusion; the schizophrenic therefore employs words without understanding their functional uses.

The theory that the language disturbances of the schizophrenic patient represents a withdrawal from reality was advanced by White.[29] The schizophrenic supposedly withdraws from conflict with the external world in order to protect himself. Thus he feels safe only in his severance from the "world." Furthermore, the experiences which are realized to be imaginary by the normal person are now considered real by the schizophrenic. He expresses in language ideas which to the observer appear distorted but which to the patient may represent a self-sustaining continuity. White believes that schizophrenia is a regression psychosis, and the language of the schizophrenic is of a lower order of abstraction than that of the normal adult.

In spite of the statements of some psychiatrists that the language of the mentally abnormal person, especially that of the schizophrenic, represents a regressive activity, a number of observers

[28] George K. Zipf, The psychobiology of language, 1935, Boston, Houghton Mifflin & Co., pp. 216.

[29] Wm. A. White, The language of schizophrenia, Archives of neurology and psychiatry, 1926, 16, 395-413.

have pointed out that a psychosis must be considered as a disease entity. Although the symptoms of the psychotic person as represented in his verbalizations are related to his previous experiences, it is doubtful, according to these observers, whether they represent merely a reversion to previous levels of behavior. The growing belief in recent years that the psychoses are due to reactions to psychogenetic influence, as is no doubt true in the psychoneurosis, has been less emphasized lately. The verbalizations of the psychotic individual do contain memories of experiences of childhood and adolescence which are verbalized in such a way that they cannot be clearly understood when interspersed within other trends of ideas. It is most probable that the distortions of the language of the psychotic individual, especially of the schizophrenic, are due to a disordered mental activity influenced to some extent by regressive reactions.

Of the disorders of language of the various psychoses, those of the manic (depressive) can be most easily explained. The manic's language represents a flight of ideas and thus a speeding up of his verbalizations. The manic is easily distracted and therefore cannot convey his ideas clearly. There is no actual distortion of language except for the type of reaction which represents ideas of grandeur. And this is probably not a true language distortion. The following example of the verbalizations of a manic patient illustrate the rôle of the flight of ideas and should be compared with the examples of the verbalizations of a schizophrenic patient which will be given later.

Yesterday I went downtown to buy $50,000 worth of real estate but they wouldn't believe me when I said that I would earn enough in the next month to pay them for it. You know my father is a big man in the city. You wear nice clothes and how much does the watch cost. Have you a sister? I have three and they are all very fine girls—girls, curls, furls, isn't that funny?

The sound association represented in the rhyming is perhaps the only distortion seen in this example, and yet it probably represents only a flight of ideas.

As in the case of the manic, the schizophrenic may also answer a question by introducing either another idea or another question. Repetition as well as perseveration are, however, much more frequent in the schizophrenic. The interpolation of irrelevant material

is rarely seen in the manic except when some stimulus within the environment causes the flight of ideas. It is not uncommon, however, in the schizophrenic without any outward stimulation. In asking for a drink one schizophrenic patient said, "Well you see nurse, if I may, my father said, well you know, if it is permitted of me, if you will consent for me to have a drink." When he was asked how he liked the hospital he answered, "Nicety of schools approved here I like it."

So-called word and sentence salads are also present, and probably represent an interpolation of irrelevant material. When the same patient was asked whether he had been home since he had entered the hospital, he answered, "No sir. No opportunity. I possess no keep." Language confusion which does not represent entire irrelevancy is also observed. On one occasion this patient asked whether the nurse could tell him the square root of a barber chair. At that time he was writing some figures on a sheet of paper while he was waiting for the barber.

The interesting point about the word salad verbalization is that frequently a central idea is carried out in spite of irrelevant interpolations. Thus when the patient was asked why he wanted a shave he said, "To get ready for your shave includes all these verbs. Being is outstanding. Freeing a fellow of ugly hair follicles that predominate. Useful neatness is a desire of me too."

At times the schizophrenic's language appears to be like that of a child, partly because continuity is interrupted because the verbs are left out. When one patient was asked why he didn't go upstairs to do some drawing in occupational therapy he said, "O. K. drawing. Search there forenoon. Assignment might as well as to wait and not do. Upstairs surely regard appointment." Whether this represents a conflict between the language ability of the individual and his regression to a childhood method of expression, as some observers categorize the schizophrenic's language, cannot be clearly ascertained. The interpolation of words, phrases and sentences relating to the individual's previous difficulties may be due either to chance memory associations or to specific conflicts, the verbalizations of which cannot be relevantly projected.

Disturbances of language such as are found in adult psychotic patients are not clearly manifested in children. A number of

observers have reported, however, that occasionally a child shows symptoms typical of schizophrenia including a disorder of language.

Observation in a school [30] for emotionally and socially disturbed children has shown that language disorders are not infrequent in the dissociative conditions. As an example, one boy of 12 came to the school because he seemed disoriented at home and frequently wandered away from his classroom. This boy was unsocial, accused other children of interfering with him, and preferred to read or to play solitary games rather than take part in group activities. On a number of occasions he was observed talking to himself while playing checkers alone (apparently as if his right hand represented himself and his left hand another person). At times he made a move and said loudly, "Burton, a swell move, you'll win the game." When this boy was asked a question he frequently answered by elaborating his response in great detail. For example, he was asked how many hours he spent in the classroom during the day. After some deliberation he answered, "9 to 12, and 25 minutes for recess. Then 1 to 3 and 10 minutes for the toilet. Altogether my answer would be about 300 minutes." His language showed evidence of disorientation. He was asked what time he would arrive at a destination if he started at 2.10 and it took him 15 minutes for the journey. He gave as his answer, 2.95. On one occasion, the teacher asked him to find the answer to a problem involving the yearly increment of a boy's growth. In his answer he included figures showing 12 feet of growth during a period of three years. He was not able to comprehend the meaning of his error. This boy also showed negativism. On one occasion he was seen to walk back and forth outside the school building. When the nurse asked him why he didn't come in, he said, "I am wearing rubbers and I know they are too big and dirty."

A similar language disorientation was observed in a boy of nine whose parents complained principally of his severe temper tantrums. On one occasion when he was weighing himself he asked the nurse, "Is this right, am I 60 pounds tall?" When he was told that height was measured in feet and inches, he said, "Well, I am growing all the time, so I can be any height."

[30] The Orthogenic School, University of Chicago.

SUMMARY.

From the foregoing account it can be readily seen that language is the chief aid to personality adjustment. The overt non-verbal adjustmental reactions which allow an infant and young child to relate himself to others are replaced to a large extent by linguistic activity. In various neurotic and psychotic disorders a skilled observer may be able to detect personality disturbances long before they may show themselves by distortions of overt activity. Difficulties arise, however, in the attempt to make diagnoses from observations of language alone because the verbal responses may not give a true picture of the individual's personality. This is especially true of the psychoses because even an accurate account of the mental content may not be sufficient for a definition of the personality disorder.

ELECTROENCEPHALOGRAPHIC ANALYSES OF BEHAVIOR PROBLEM CHILDREN.*

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The present study is concerned with electroencephalographic examination of behavior problem children admitted to the Emma Pendleton Bradley Home.[1] Since the diagnosis of "behavior problem" in children is known to represent a very heterogeneous group from an aetiological standpoint it was felt that the important electrical signs of brain function given by the electroencephalogram might contribute to our understanding of certain of these cases.

Case Material.

Seventy-one children between the ages of 2 and 16 (median 11 years), 12 girls and 59 boys, who had been admitted to the Bradley Home with the primary diagnosis of behavior problem were examined. The average I. Q. of the group according to the Stanford-Binet test was 92, with a range from 55 to 140. Only 5 cases were included with I. Q.'s. below 70, so that mental deficiency in the usual sense was not an important factor in the behavior disorders under consideration.

There were 35, group A, who had a history suggestive of central nervous system disorder, some with physical signs of nervous system defect. Eleven had had what appeared to be encephalitis, five, birth injuries, four, head injuries and six, severe paroxysmal attacks of asphyxia in childhood (four with severe whooping cough, one with asthma, one with laryngismus-stridulus). Two of the patients in group A had an hereditary visual defect, three, a family history of epilepsy, and three had a history of convulsions in infancy (cause unknown). Twelve of this group showed some physical signs of central nervous system defect at the time of

* From the Emma Pendleton Bradley Home.
Research aided by a grant from the Rockefeller Foundation.

admission (hemiparesis, defects in visual apparatus, weakness of right leg, central hearing defect, postencephalitic chorea, or dilatation of ventricles by Roentgen encephalogram).

The other 36 cases, group B, had no history or physical signs of organic disease of the central nervous system.

The entire group of 71 patients might also be divided into three main classes on the basis of the most prominent features of their behavior disorder. Class 1 was made up of 30 patients whose behavior might be described as hyperactive, impulsive, highly variable, and involving spontaneous misbehavior apparently unrelated to environmental situations. Many had characteristics in accordance with what has been considered the "epileptic" personality reaction.[2-8]

Class 2 included 11 patients which might be described as out of contact or withdrawn, bizarre, and emotionally immature or, briefly, "schizoid." (Two of these cases also fell in Class 1.) Class 3 was a miscellaneous group made up of the remaining 32 cases which were too varied for further differentiation in this study. They included school problems, delinquency, problems apparently growing out of difficult home situations, etc. Illustrative case histories will be given at the end of this report.

For comparison with these cases we had electroencephalographic records from 40 normal children of comparable age, from 70 normal adults, and from 219 patients with other nervous or mental disorders.

Technique.

The details of the technique used for recording brain potentials in this study have been previously described.[9] It consisted essentially of adequate samplings of both bipolar and monopolar records from bilateral frontal, central, and occipital regions of the head. The E.E.G. from four head regions were recorded simultaneously on photographic paper. The patients were lying quietly in an electrically shielded sound-proof room throughout the examination. An observer in the room with the patient signalled all movements directly on the record to provide an adequate check on movement artifacts and to see that the patients did not go to sleep.

A total of 116 separate examinations were made on the 71 patients. Twenty eight patients had two or more examinations on

separate days. As many as seven separate examinations were made on one patient to study the variation in record from day to day.

The records obtained were read for the percentage of the 10/sec. α waves from different head regions and for the presence of other types of waves which previous study had shown to be of pathological significance insofar as they were not found in a group of normal control subjects. Criteria of abnormality discussed elsewhere [10] have been modified only slightly in the present study. The only quantification of the amount of abnormality has been a measurement of the percentage of record occupied by abnormal potentials for at least a 100 second sample.

Results.

When the brain potentials of the group of behavior problem children were compared with records from the group of non-behavior problem children (also Lindsley [11]), of comparable age, it was found that only 29 cases (41 per cent) showed electroencephalograms from all head regions which fell within the range of variability shown in the control group (so-called "normal" children). Ten of these 29 cases showed occasional potential waves which were of questionable normality, but since they did not occur to a greater extent than that found in some of the control group they were classed as questionable rather than definitely abnormal. This leaves, therefore, only 19 cases, or 27 per cent, of our total group of behavior problems whose electroencephalograms could be unquestionably considered as normal. Five examples of the electroencephalograms which were considered normal are given in Fig. 1.

It will be noted that a fairly continuous regular α rhythm between 9 and 11/sec. is characteristic of the occipital region. We have found this remarkable continuity of α rhythm more common in normal children than in normal adult subjects.

The central and frontal regions show much less regular α rhythm but when it is present it appears at about the same frequencies as from the occipital region. The β rhythm at 20-30/sec. was found more prominent in frontal and central regions. There were occasionally two or three waves also in the central or frontal regions at frequencies below what is considered the normal α

range, that is, at frequencies of 5-6/sec. Since these slower waves were also found in some of the control subjects they have not been considered abnormal, unless they make up a sufficiently large portion of the record. For the purposes of this study we have considered a record abnormal if the waves below 7/sec. occurred during more than 10 per cent of at least 100 seconds of record. We realize that this criterion is somewhat arbitrary and will probably have to be revised, but it will serve the purposes of the present study. We cannot assume, of course, any sharp distinction between normal and abnormal records but rather a continuous distribution of degrees of abnormality or normality. The 11 cases we have placed in the questionable group represent that borderline where it was impossible to call the records definitely abnormal, but due to certain peculiarities present (*e.g.*, bilateral asymmetry, abnormal variations in frequency) they could not be called strictly normal.

Forty-two cases, or 59 per cent of our total group of behavior problems, showed in their electroencephalograms various kinds and degrees of abnormal brain function. The abnormalities consisted of marked irregularities in frequency and amplitude chiefly in the form of potential waves occurring at frequencies between 2 and 6/sec., or of potential waves whose duration was between 150 and 500 millisecs. A marked bilateral asymmetry was also present in some cases. Representative sample records from 5 of these cases are shown in Fig. 2.

The Epileptoid Group.

Twenty eight cases, or 39 per cent of the total group, showed rather sudden bursts of large amplitude waves, sporadically or in regular sequence, at between 2 and 4/sec. The records from this group of cases suggested very strongly the type of activity found in many clinically recognized epileptic patients between overt clinical attacks. Half of these cases [14] showed the spike and slow wave form [12, 13, 14] either irregularly throughout the record or repeated in regular 3/sec. sequence after 30 secs. to 1 min. of over-breathing. The other cases did not show the spike and slow wave form but were classified in this same group because of sudden bursts of large amplitude, 2-4/sec. waves, or the occurrence of large stray waves singly or in groups of three or four giving a

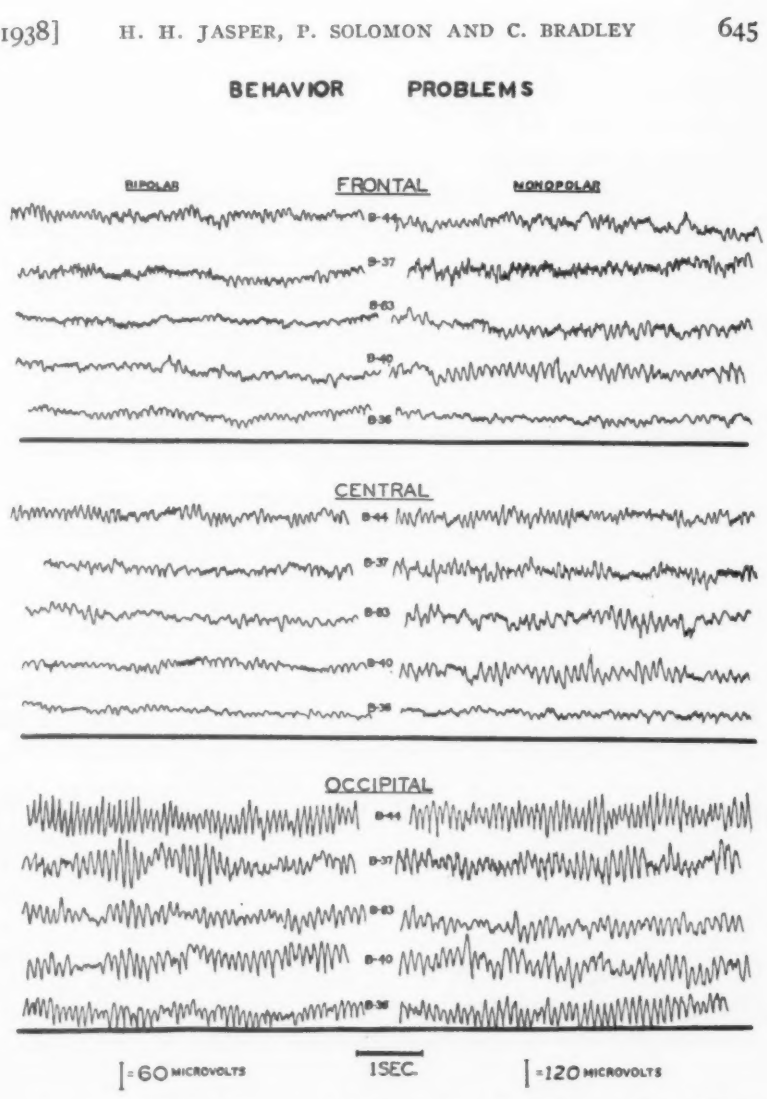

FIG. 1.—Normal electroencephalograms from behavior problem children. Tracings from both monopolar and bipolar photographic records of the electrical activity from the frontal, central, and occipital regions. Five typical cases are presented the serial order of each patient being the same for each head region; that is, the first line of bipolar and monopolar records of the frontal region is from the same patient as the first lines of the central and occipital region, etc. Sensitivity of all bipolar records has been equated to the calibration indicated for 60 microvolts with the monopolar records equated to one-half this sensitivity.

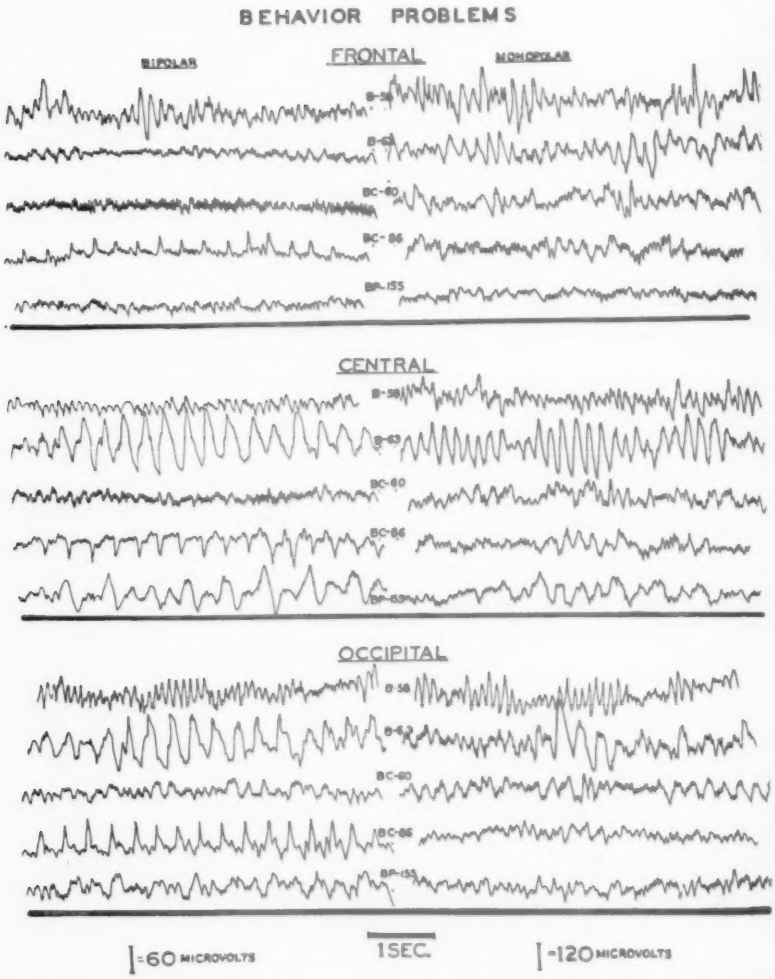

FIG. 2.—Abnormal electroencephalograms from behavior problem children traced in the same manner as for Fig. 1. The first patient shown (first line frontal, central and occipital) was considered questionably normal except for the potentials from the frontal regions.

very disorganized and poorly regulated appearance to the record. This type of activity was similar to interseizure activity in known epileptics who did not show the spike and slow wave form. It appears, therefore, that the basis of the behavior problem in 37 per cent of our total group was shown by the E.E.G. to be previously unrecognized but definite epileptoid disorder. This group of cases will tentatively be referred to for the purposes of this study as the epileptoid group without implying that they represent a truly homogeneous group or that they are necessarily epileptic in the usual clinical sense.

Slow Waves and Lack of Integration.

The remaining 14 cases whose E.E.G's. were judged as abnormal showed slow waves at amplitudes not much greater than that of the normal activity which was usually present at the same time either from the same head region showing the slow waves or from other head regions. These cases were not classed with the epileptoid group because they did not show the sudden bursts of large amplitude potentials nor the high variability. The distinction between these cases and the epileptoid group is very difficult to make in some cases. In 5 of these 14 cases there was a marked bilateral asymmetry, slow waves at 2-6/sec. appearing consistently from a given region in one hemisphere at the same time as a fairly normal record from the homologous region in the other hemisphere. In other cases a 5-6/sec. rhythm would predominate in the anterior head regions simultaneous with an 8-10/sec. rhythm from the posterior regions. These may be signs of poorly integrated cortical function since they were of rare occurrence in the normal subjects as compared to behavior problem children.

A Sub-Alpha Rhythm.

A rather prominent characteristic of the E.E.G. from some cases was the occurrence of a regular rhythm of smooth waves at 5-6/sec. from the central and frontal regions of the head. In 16 cases this rhythm occurred during 10-60 per cent of 100 second samples from the frontal or central regions. In two cases it would appear in large amplitude bursts of five to ten waves each but for less than 10 per cent of a sample record. It was not found from the occipital region in this group of cases.

The potentials of this rhythm are frequently of greater magnitude than the higher frequency waves found simultaneously from the same head regions. With the monopolar leads they range from 100-300 microvolts in magnitude and are about one half this value from bipolar leads. In most cases they were present with a regularity equal to those of the normal occipital α rhythm. This subalpha rhythm may persist through visual stimulation which blocks the occipital α rhythm. In one case these slower waves would start in the left frontal region and spread to the central regions on both sides before involving also the right frontal region. In no case was there observed a gradual change in frequency between either this rhythm and the 10/sec. α rhythm or the 2-4/sec. waves of petit mal epilepsy. In 6 cases out of the 18 in all from whom the 6/sec. rhythm was prominent there occurred also occasional bursts of large amplitude waves at about 3/sec. The 6/sec. rhythm is normal from the anterior head regions in very young children (below two years) so that it may be related to a lack of maturation in certain areas of the brain.* No relation was found between intelligence test results and the E.E.G.

Relation to History Suggestive of Central Nervous System Disease.

In group A, the 35 cases with a history which was at least suggestive of central nervous system disease or defect, 26 children (74 per cent) showed some abnormality in the E.E.G. The abnormality in 19 of these cases was of the epileptiform type.

Conversely, of the total of 42 cases showing an abnormal E.E.G. 26 (62 per cent) had a history suggestive of central nervous system disease or defect. Of the 28 showing the epileptiform type of abnormality, 19 (68 per cent) had a positive history. Of the 29 cases with brain potentials within normal limits there were 9 (31 per cent) who had a positive history. The positive histories included birth injury, encephalitis, poliomyelitis, and epilepsy in early childhood.

* It has appeared sufficiently distinct from other rhythms to deserve especial study in relation to other pathological conditions to be reported later. A suggestion as to its possible significance is given from its relation to the extrapyramidal motor system as shown in a case of abnormal tremor.[15]

Ten of the 12 cases (83 per cent) with physical signs of a defective central nervous system showed some abnormality in the E.E.G. Six of these cases showed epileptiform waves, and four cases showed slow waves with bilateral asymmetry. One of the two cases showing brain potentials within normal limits had a right leg weakness following poliomyelitis and the other showed irregular fixed pupils with some choreiform movements.

Relations with Behavior.

Of the 30 cases, in Class 1 above, with behavior similar to that often described for the epileptic personality, 21 (70 per cent) showed brain potentials judged to be epileptiform and four showed slow waves to a pathologic degree. Twenty-five of the 30 cases (83 per cent), therefore, showed an abnormal E.E.G. The E.E.G. obtained from the six remaining cases was entirely normal even though they presented severe behavior problems of the hyperactive, impulsive, erratic type.*

Two of the 11 cases classified as schizoid from behavior symptoms (Class 2 above) showed the epileptiform brain potentials. One case (R. S.) was an extremely hyperactive, impulsive, psychotic child with a complex delusional system. It is interesting to note that two weeks following our classification of this boy with the epileptoid group from the E.E.G. he had his first grand mal convulsion. Both cases had been grouped also in Class 1 because of their hyperactive, impulsive, erratic characteristics. Apparently these cases were more allied to a severe epileptoid psychosis than to a schizophrenic process although clinically they presented many full-blown symptoms commonly associated with schizophrenia. An abstract of the case history and a sample of the E.E.G. in the more extreme case is given below.

Case 1 (R. S.).—Eight-year-old white boy of intelligent parents, whose father suffers from myotonia, and whose mother has had two "nervous breakdowns" of the manic-depressive depressed type. The pregnancy, birth, and early development were approximately normal. After talking fairly clearly at one year he seemed to lose the ability to speak and since then has been noted to have a speech defect. During early childhood he was hyperactive, showed no judgment, was immature in his play, adjusted slowly to new

* A normal E. E. G. is found also in some known epileptic patients when the records are taken between seizures.

situations, and had many temper tantrums. He had no illnesses except whooping cough at the age of six. There was no history of convulsive disorders of any sort prior to admission. He had been under careful observation for two years prior to admission in another hospital.

Two years before admission he had an I. Q. of 108 on the Stanford-Binet and two months before admission an I. Q. of 88, and in the hospital an I. Q. of about 75.

Physical examination showed a high arched palate and myopia but was otherwise negative. The boy was very apprehensive and moved rapidly about during most of the examination. Laboratory studies, including serology, were negative. A pneumoencephalogram showed incomplete filling but no obvious abnormalities. The electroencephalogram showed many abnormalities of the epileptiform type. Behavior in the hospital was extremely bizarre. In general, he was fairly cooperative to the daily routine. He spent a great deal of time with his fantasies, however, building large structures with clay blocks, placing marbles in them which he said were people and describing what he had built in unusual terms, such as, "This is the basement; this is the subbasement; this is the attic"—there being no logical regard for the location of the places he had so named. He was very talkative and loud in conversation with adults, repeatedly asking questions such as "Am I a baby?", "Am I a big baby?", "Am I eight years old?", "Is my heart here?" (pointing to the right side) or "Is it here?" (pointing to the left). He usually was very much upset when his questions were not answered. One day he complained of a headache and said that God gave it to him because "I swear to him too much." He had three grand mal convulsions during his stay in the hospital, the first occurring just ten days after the epileptiform activity was observed in the E.E.G. It was noted that he was very noisy, irritable, and agitated at frequent intervals following each of these. He made active efforts to run away from the hospital frequently. He occasionally talked to imaginary persons suggesting the possibility of hallucination. After four months observation he was discharged to a state school for custodial care.

Diagnosis: Behavior problem, convulsive disorder, and possible early dementia præcox.

Five of the remaining 9 cases classified as schizoid showed definitely abnormal E.E.G. but not of the epileptiform type. The predominant characteristic of these records was their continuous disorganized appearance with slow and fast waves mixed in together, a lack of correspondence between the simultaneous activity from bilaterally homologous regions or a similar lack of the normal degree of integration between ipsilateral regions. Two of the remaining 4 cases were questionably normal, one showing no α rhythm whatsoever from any head region with prominent β potentials from the anterior portion of the head (a hyper-activation picture [10] not found in our normal children but in some normal

adults), and the other showing a prominent 16/sec. rhythm from the central region with highly variable frequency of occipital α rhythm and some bilateral asymmetry. These latter two records were from two of our most severely schizoid children. Brain potentials similar to theirs were not found in any of the control children but they were not considered abnormal because of the questionable cooperation at the time of the examination which might have influenced their brain activity in the direction of that observed. One of these cases deserves special mention both because of her remarkable behavior and unusual E.E.G.

CASE 2 (E. S.).—A seven-year-old white girl of intelligent but neurotic parents. The father is hypertensive and alcoholic; numerous neurotic relatives but no frank mental disease in the family. The patient is the first of two siblings. Birth and early development were normal except for speech which was not present until over three years of age. Early feeding was difficult. With the birth of her sister when she was 18 months of age the child began to demand a great deal of attention, reverted to a good many infantile habits, such as soiling herself, and became destructive. Later childhood was characterized by negativism, temper displays, and destructive self-centered activity. She had been treated in several schools and hospitals prior to admission. Possibly two convulsions occurred four months before admission. She is reported to have had severe scarlet fever at 17 months and "acidosis" frequently in infancy.

Physical examination was negative except for posturizing and poor cooperation. Psychological reports showed consistent dull normal intelligence, but cooperation was poor and it was felt that actual intelligence may have been above this level. Laboratory studies, including serology, were negative.

In the hospital the child's behavior varied a good deal uninfluenced by external surroundings. Most of the time she was quite amenable to suggestion and was easily led in various activities. Occasionally she was actively negativistic as, when after a sunbath, she remained obdurate for 45 minutes in the hot sun obviously uncomfortable but unwilling to accompany the nurse into the building. On several other occasions she would stand by the window in the evening for five or six hours almost motionless with her hand over her eyes, making no response to suggestions to go to bed. She would sometimes be seen walking about alone in her room her arms extended and her head on one side, talking and mumbling to herself. On one occasion, after several days of quiet behavior, while eating with a group of children, she suddenly upset the contents of her dish over her hair laughing to herself. She showed a rich fantasy life often scolding herself, saying, "Betty, you naughty, naughty girl, never do that again." She was often seen talking to her fingers, calling them by name, such as, "Humpty Dumpty," and occasionally smearing them with feces, saying she was feeding them. Many other sorts of bizarre behavior were observed, such as occurred one day when, after she had been laughing and talking jovially with an adult, she suddenly

ran to her, snatched her hand, and cried with great anxiety, "You forgot to bring along the pictures of a man." Sometimes she struck herself and cried that it hurt.

In this child there was no response to psychotherapy. It was noticed that she was a little more active and cooperative when under the influence of sodium amytal. One day after a period of extreme negativism, wherein she had done nothing for herself and had spoken to no one for several days, she received the drug intravenously and immediately thereafter got up, dressed herself alone, ate heartily and for a short time behaved in a very natural fashion, gradually slipping into her catatonic state afterwards. There was no permanent improvement. She never had any convulsions in the hospital.

Diagnosis: Behavior problem, possibly early dementia præcox, catatonic type.

The electroencephalogram, although presenting some very curious characteristics, is remarkably normal considering the extent of the behavior disorder in this child. Another schizoid reaction in a mild case showed what appeared to be a completely normal E.E.G.

Of the miscellaneous group of 32 patients (Class 3 above) there were 11 with normal and 8 with questionably normal electroencephalograms; a total of 19 (59 per cent) of this miscellaneous group who did not have definitely abnormal records. These were cases of educational difficulty, delinquency, enuresis, temper tantrums, hysterical fits, etc.

Seven of this group (Class 3) showed the epileptiform type of brain potentials, one of which had unexplained periods of irritability and two had occasional periods of confusion in school and slight "staring spells" but showed none of the other characteristics of Class 1. The six remaining cases showed various degrees of abnormality in the E.E.G. which was judged not to be of the epileptiform type. They were children who had such prominent symptoms as poor emotional control, delinquency, vomiting and mutism, dull and apathetic or hyperactive behavior but who lacked the "explosive" variability characteristic of the cases described in Class 1.

Treatment and Prognosis.

We are not prepared to make very definite statements as yet in regard to the bearing of the electroencephalographic findings on treatment and prognosis particularly because of the varied forms of therapy used. Follow-up studies over a period of from one

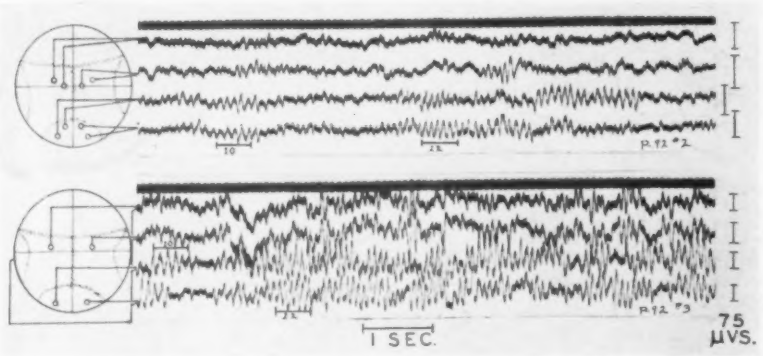

FIG. 3.—Electroencephalograms from patient E. S. (see text). The upper records are from bipolar leads to the left and right central and to the left and right occipital regions respectively (simultaneously recording). The lower records are from the same head regions with monopolar leads and reduced sensitivity. Note the irregular broken appearance of the potentials from the central regions and the poorly regulated α rhythm oscillating from 10-12/sec. throughout the occipital record.

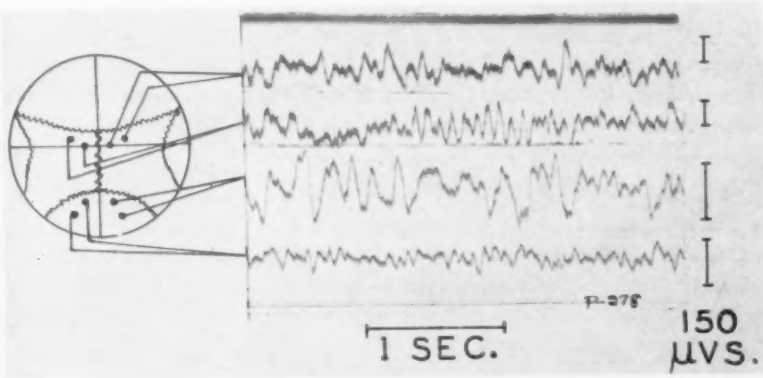

FIG. 4.—Electroencephalograms from patient R. L. (see text). Simultaneous records from bipolar leads to the right and left central and occipital regions are presented. A fairly normal α rhythm at about 11/sec. was observed from the left central and occipital regions simultaneous with large slow waves from the right central and occipital regions, some abnormality being present also on the left.

to four years may give some indication of the prognosis of this group with the forms of guidance given at the Bradley Home and by the manipulation of the out-patient environment without reference to new forms of drug therapy which have been studied only recently.[16] The present clinical status was estimated according to a scale from a double minus (− −) as extreme deterioration to zero (0) indicating no improvement and a double plus (+ +) indicating marked improvement or a very satisfactory adjustment. Relations to electroencephalographic findings are shown in the following table:

CLINICAL STATUS.

E. E. G.	− −	−	0	+	+ +	N Total
Normal	0	1 (4%)	6 (32%)	6 (32%)	6 (32%)	19
? Normal	1 (10%)	1 (10%)	3 (30%)	5 (50%)	0	10
Slow waves	0	2 (15.5%)	6 (46%)	5 (38.5%)	0	13
Slow waves and epileptiform ..	1 (3.5%)	3 (10.5%)	19 (68%)	5 (18%)	0	28

It appears that without medication, and with the amount and kind of therapy given these children, the prognosis for most of those with abnormal brain potentials is poor, while the prognosis of those with a normal E.E.G. is better, the majority showing definite improvement. It is also significant that only those with normal brain potentials were found to be making a complete adjustment.

The fact that 10 cases were found to be making a fair adjustment in spite of persistent abnormalities (although in most cases less severe) in their brain potentials shows that the abnormalities of brain function indicated can be compensated for by psychiatric treatment and with the proper manipulation of the environment. The more severe cases, however, as judged by the frequency and persistence of abnormalities in the electroencephalogram, have been found particularly refractory to any form of psychiatric treatment. The most promising results have been obtained so far by the use of benzedrine with these cases.[16] Correlated studies of the effect of the benzedrine and luminal are now in progress.

Discussion.

The electroencephalogram has succeeded in revealing a definite abnormality of brain function in over one half of a group of child behavior disorders * which had been previously considered as largely psychogenic. The behavior problems of the type presented vary in severity and form not only according to the severity and locus of electroencephalographic defect but also according to the general characteristics of the individual personality. For example, there may be a withdrawal reaction as opposed to a hyperactive aggressive reaction to periods of episodic confusion or momentary interruptions in consciousness. The nature of the precipitating circumstances or situations are also important.

It will be noted that the predominant feature of the abnormalities noted in the E.E.G. was the occurrence of slow waves from one or more regions of the head. It is known that such slow waves may be caused in a variety of ways, as for example, by certain changes in the metabolic balance of the cells as in decreased sugar or carbon dioxide content of the blood, or they may be caused by more permanent structural alterations in cortical cells such as those following vascular accidents or other encephalopathies. They occur also with the disturbance in brain tissues surrounding a brain tumor, and they are found even in normal sleep.[10] There were very significant differences in the kind as well as the degree of abnormality shown in the electroencephalographic records, but we have been unable as yet to relate many of these differences to known lesions. Further studies of these relationships as well as those to certain characteristics of the clinical picture are in progress.

Perhaps the most significant finding in this study is the clinical and electroencephalographic definition of a rather homogeneous group of behavior disorders which we have designated as the epileptoid group. The behavior symptoms of this group of cases shows rather striking resemblances to personality disorders found in known epileptic patients with mental changes occasionally similar to those in epileptic psychoses. The following is a typical case:

Case 3 (R. L.).—An 11-year-old intelligent white boy whose parents are of Portuguese extraction and dull intelligence. The economic situation is

* The children admitted to the Bradley Home represent, in general, the more intractable problems of clinic and private practice.

poor. There are six normal siblings. The patient's birth, early infancy, development and health were normal until he entered school at the age of six, since which time he had been very irritable. School teachers reported that he had a terrific temper and occasionally injured other children and broke furniture when he became angry. The mother reported that he had occasional dizzy spells. His scholastic work was good in all subjects but he was expelled from the public school because of his behavior. The only past illnesses were chicken pox at eight years and measles at nine years of age. Physical examination and laboratory studies and blood Wassermann were negative. Psychometric tests indicated normal intelligence.

The child's immediate adjustment into the hospital situation was fairly good except for frequent unprovoked temper displays. The child would become exceedingly angry for little obvious reason. Sometimes when another child brushed against him in the corridor the patient would attack the youngster no matter what his size, kick him, and bite him in a vicious manner. On other occasions he would not be at all disturbed by the same event. On one occasion the nurse suggested bedtime whereupon he turned on her, kicked her in the chest, and was extremely profane. Usually he was quite amenable to similar suggestions. The patient himself said, "At times I get so mad I see red. I can't help but rush in and fight like a bull."

No seizures of any sort were observed and there was no history of convulsions in the patient or in his family.

Diagnosis: Behavior problem, question of epileptic personality.

Such a clinical psychiatric group has long been recognized. Krafft-Ebing described these cases very clearly as early as 1868 in an article entitled "Die Transitorischen Störungen des Selbstbewusstseins." [2] Most authors relate them definitely to the epilepsies [3-8] although Kleist [17] and recently Kasanin [18] make a distinction between the mental and personality changes in epileptics and a proposed syndrome of "Episodic Confusions." The electroencephalogram serves to classify them definitely with the epileptoid disorders. This does not imply any single aetiological agent nor identity of symptoms as might be expected from the highly varied nature and aetiology of the epilepsies.

Summary.

Electroencephalographic and clinical studies of 71 behavior problem children have been presented. Abnormalities in brain potentials were found in 71 per cent of this group with very marked abnormalities appearing in 59 per cent. Epileptiform electrical activity was observed in 39 per cent of the cases. These latter patients showed characteristic mental and emotional disturbances

analogous to those often associated with the epileptic personality. In only two of these cases was epilepsy suspected previous to the electroencephalographic findings and none were having convulsions at the time of examination.

It is concluded that abnormal brain function as revealed by the electroencephalogram is an important component in the aetiological picture of the majority of a group of problem children whose disorder had been considered as primarily psychogenic previous to using this method of diagnosis. The nature of the fundamental pathology of the brain indicated is not as yet known, but the findings have been found important in evaluating prognosis and treatment.

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PSYCHOSES AMONG COLLEGE STUDENTS.*

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In recent years, considerable attention has been directed to the question of mental health among college students. In view of this, it was felt that a study respecting disturbances of actually psychotic type occurring in this group might prove of interest.

Pertinent to this end, it was felt also, should be the experience of the psychiatric unit established in 1930 as a full-time activity of the Student Health Service at the University of Michigan, a typical large mid-western institution. A careful analysis, therefore, has been made of the material of this unit pertaining to the psychoses, covering the seven-year period from September, 1930, to September, 1937, that is, the number of full years the department has functioned. The data thus secured constitute the basis of this report.

The total enrollment † during the seven years in question was 85,543, with a yearly average of 12,220. The total number of individual students coming to the attention of the mental hygiene service over this period was 4779, an average of 7.67 per cent of the student body having been seen each year.

In 114, or 2.38 per cent of this series of 4779 cases, psychoses of various types were noted. The incidence of new psychotic cases has averaged 16.3 per year. While there was some variation in incidence over the total period (Table I), this could not be explicitly related to any specific element or change socially or respecting personnel. Incidentally, if reopened and continued cases are included, the gross average annual rate is found to be 22.4.

From the foregoing, it would seem to the extent the Michigan experience may be taken as representative, that the expectable

* Read at the ninety-fourth annual meeting of The American Psychiatric Association, San Francisco, California, June 6-10, 1938.

† Based upon the number of students paying the University Health Service fee. If those not paying this fee are added, the inclusive total is 86,788, and the yearly average is 12,398.

yearly incidence of psychoses in college populations, not including reopened or continued cases, may be taken as at least 1.3 per thousand. Actually, it is likely the rate would be somewhat higher as it is quite conceivable all cases occurring, particularly among the men, did not come to our attention. If reopened and continued cases are included, the annual expectancy, on the basis of the Michigan experience, would be 1.8 per thousand.

Of the 114 individuals developing psychoses, 64 (56.1 per cent) were men and 50 (43.8 per cent) women. This represents a ratio of 1.28 for men to 1 for women, definitely less than the men-to-

TABLE I.

INCIDENCE OF NEW PSYCHOTIC CASES PER YEAR.

	No. of men.	No. of women.	Total.
1930-31 *	12	9	21
1931-32	10	6	16
1932-33	5	10	15
1933-34	5	3	8
1934-35	10	5	15
1935-36	14	6	20
1936-37	7	9	16
1937-38 †	1	2	3

* Not including Summer Session.
† Including only Summer Session.

women ratio for the University as a whole, which has averaged 2.35 to 1 for the seven-year period. On this basis, if the incidence of psychoses for the sexes had been the same, the expectable distribution would be 70.1 per cent for men and 29.8 per cent for women, or 80 cases and 34 cases respectively.

The reason for this greater relative incidence for women, if valid, is by no means clear, although in some measure the closer supervision accorded women students may have played a part. Also, the fact that more women fell in the higher age groups may be of significance. This point of incidence in relation to sex is especially interesting in view of Malzberg's * findings based upon New York City material, indicating the psychosis expectancy for men to be rather higher than for women. His figures, to be sure,

* The Expectation of Mental Disease in New York City in 1930. Malzberg, B., Mental Hygiene, 21, pp. 280-290, April, 1937.

are based upon committed or certified hospital cases, chiefly apparently in public institutions. In this connection, it is possible if all cases occurring, irrespective of hospitalization or type of hospitalization, were considered, a somewhat different distribution as to sex might be found. Of bearing here is a recent census report * indicating the ratio of men to women in public hospitals, exclusive of Veterans Bureau units, to be 1.10 to 1 in contrast to only 0.60 to 1 for private institutions. In this relation, Cohen and Fairbanks' recent survey † of the Eastern Health District of Baltimore is of interest also. These authors estimate the psychosis prevalence for this area in 1933 as practically the same for white males and females, thus 874.4 and 875.7 respectively per 100,000 of the population 15 years of age and over.

The ages when the obtaining psychotic conditions came to attention ranged from 17 to 56 years, the average being 23.95 years and the median 21.94 years. The range, incidentally, for schizophrenia was 17 to 40 years (average 21.59, median 21.00) and for the manic-depressive group 17 to 43 (average 23.63, median 21.75). For the paranoid conditions, the range found was 19 to 56 years (average 34.42, median 34.50). The range for men was 17 to 39 (average 22.44, median 21.83) and for women 17 to 56 (average 25.88, median 22.00). That is, as mentioned, there was a definite weighting for the women relative to the higher ages. Actually, 26.0 per cent of the women were over 30 as compared to 6.2 per cent for the men.

Status in the University as regards year in school at the time psychotic disorder was first noted is indicated in Table II. From this, it will be seen that in the greater number of instances, psychotic development occurred or came to view clinically during the first year. The second and third years followed with definitely smaller totals, and the later years with even less.

Twenty-four of the series, or 21.0 per cent, it should be added, had been seen by the unit prior to the occurrence or detection of actual psychotic difficulty. For 19, this first contact occurred during the first year in school, for one during the second, and for two each during the third and fifth years.

* Bulletin, Bureau of the Census, Department of Commerce, Washington, January 10, 1938.

† Psychosis in the Eastern Health District, Cohen, B. M., and Fairbanks, R. E., Am. Jr. Psychiatry, 94, pp. 1376-1395, May, 1938.

The period elapsing in these 24 cases from the time of the first contact and the point when psychoses were actually found to have become established is shown in Table III. Period here refers simply to time elapsed, not specifically to year in University, and therefore includes such interruptions (3) in University attendance as have occurred.

TABLE II.

YEAR IN UNIVERSITY WHEN PSYCHOSIS WAS DETERMINED.*

	No.
First year	55
Second year	24
Third year	18
Fourth year	8
Fifth year	8
Sixth year	1

* Here it should be noted that nine of the above had discontinued attendance for periods ranging from one semester to nine years.

TABLE III.

TIME WHEN PSYCHOSIS WAS NOTED.

	No.
Within one month	2
Within two months	3
Within three months	2
Within four months	1
During second semester	5
During second year	5
During third year	2
During fourth year	2
During fifth year	1
During sixth year	1

From this it will be noted that in only eight instances did psychotic development become apparent during the period of the first semester. However, in spite of the fact that in this group in most instances, actual psychotic processes probably were not established at the time the persons were first seen, the importance of these first contacts for all cases cannot be too strongly emphasized. If, at this point, there is not a full realization of the clinical facts and implications, a valuable opportunity respecting treatment and planning is missed, with corresponding loss, possibly even irretrievable damage, to the individuals concerned.

Distribution of the total series, with respect to the schools and colleges of the University at which the various individuals were in attendance when psychotic disorder was first noted, is brought out in Table IV. This it will be seen follows fairly closely distribution for students as a whole.

Cases were referred to the mental hygiene unit in the following ways (Table V). In 90 instances, it should be stated, psychoses were definitely present at the time of the first contact.

TABLE IV.

School or college.	Psychotic series, per cent.	University as a whole, per cent.
Literature, science and the arts	38.6	37.4
Graduate	25.4	26.8
Engineering	8.7	11.4
Law	8.7	4.8
Medicine	7.9	5.2
Music	4.3	2.5
Education	1.7	4.7
Architecture	1.7	2.1
Others	2.4	6.0

TABLE V.

SOURCES OF REFER.

	No.
Health service physicians	70
Faculty (including 15 with administrative connection)	21
Self-referred	16
Other physicians	3
Parents	2
Brother	1
Friend	1

In the light of the above, the importance of the general Health Service staff is readily apparent and the significance for this group, in terms of student welfare, of at least some degree of psychiatric preparation. Patent, too, is the importance of the faculty, more especially the teaching members, representing as it does the first and main line of student contact. Obviously, a basic functional orientation here as to the personality or psychobiologic aspect should be of great value, not merely respecting the early recognition of existing clinical problems, but more importantly, looked at broadly,

through enabling a fuller adaptation of the teaching function to the human material to which it is applied.

The very small number of cases referred by parents and relatives is likewise noteworthy, in view of the length of contact and opportunity for observation afforded. In fact, in the college field as well as elsewhere in psychiatric work, need for more adequate orientation and understanding by this group as to personality relations and implications, and receptivity to essential therapeutic indications, is still signally an outstanding one.

The percentage of self-referrals is, of course, gratifying but nevertheless far short of the ideal. In this connection, speaking generally and not merely for college populations, the proportion of consultations freely and spontaneously sought appears as a true and pragmatic measure of the effectiveness and progress of the psychiatric approach itself. Here involved, of course, is not only technical adequacy but also, by virtue of this and in addition a constructive conscious effort, the development of community awareness and acceptance of the functional possibilities of psychiatry in relation to natural and expectable human needs.

At this point, comment may be made as to the results of the very brief opportunity for inspection afforded the unit in connection with the general medical examinations given entering students, at the beginning of each year. Thus, of 66.6 per cent of our series seen in this way, 44.7 per cent * were found to be of frankly vulnerable type, that is, individuals for whom the University experience might be expected to be definitely trying and a strain upon adaptive capacity. For entering students in general, this fraction has averaged 23.3 per cent. As might be anticipated, perhaps, a higher proportion of unsatisfactory ratings was noted for those cases later coming to view as schizophrenic (56.6 per cent) as compared to the manic-depressive group (35.1 per cent). Similarly, of students given satisfactory ratings and later coming to attention as psychotic, it is interesting and understandable that there were definitely fewer in the schizophrenic group than in the manic-depressive. Thus, of the 12 individuals so rated who were found to have developed psychoses within the period of a year,

* If borderline or doubtful cases are included, the total vulnerable fraction is 67 per cent.

but two were schizophrenic in contrast to seven falling within the manic-depressive group.

These findings taken as a whole are especially interesting in view of the shortness of the contacts, but a minute or two, at the most, and the fact that in the large majority of instances actual psychotic disorders probably were not established at this juncture and presented themselves clinically at varying times subsequently, from within a month to seven years (Table VI).

From this, it is apparent that with facility for really adequate and thorough evaluation of entering students, frankly pathological

TABLE VI.

TIME * WHEN PSYCHOSES WERE NOTED.

	No.
Within one month	8
Within two months	10
Within three months	6
Within four months	4
During second semester	10
During second year	15
During third year	12
During fourth year	6
During fifth year	3
During sixth year	1
During seventh year	1

or vulnerable material could be detected readily, with considerable advantage to all concerned. Also, a very real service would be enabled through greater and more inclusive attention to the personality aspect in dealing with applications for admission, with arrangement for special consultation at the institution or locally in doubtful cases, including here of course not merely situations suspected as psychotic.

The types of psychoses found are listed in Table VII. In this connection, it is to be noted that only frank, well-marked conditions were considered, transient toxic reactions as well as simple reactive depressions having been omitted.

* As in Table III, time period here refers simply to time elapsed, not specifically to year in University, and therefore includes such interruptions (5) in University attendance as have occurred.

From the foregoing, it will be seen that for the total series, manic-depressive disorders showed the highest frequency, with schizophrenia closely following and paranoid conditions third. However, if paranoid conditions and schizophrenia are taken together, this joint category is found to be slightly greater than the manic-depressive group, thus 49.1 per cent and 44.8 per cent respectively. As concerns the sexes, schizophrenia came first among the men, 48.4 per cent, and then manic-depressive conditions, 40.6 per cent, with paranoid states representing only 4.6 per cent. For the women, manic-depressive psychoses were the most common, occurring in 50.0 per cent of the cases. The incidence of schizophrenic conditions (26.0 per cent) was much less among women than in the case of the men, and of paranoid conditions distinctly higher, 18.0 per cent. Also, schizophrenia and paranoid conditions together totalled 44.0 per cent for women as compared to 53.0 per cent for men. The above seems in harmony with the noted age weighting for women as compared to men. Incidentally, two brother-and-sister pairs were included in this series. In one case, both individuals were schizophrenic and, in the other, the sister's condition was due to encephalitis while the brother was schizophrenic.

TABLE VII.

DIAGNOSES.

	No. of men.	No. of women.	Total.
Manic-depressive psychoses *	26	25	51
Schizophrenia	31	13	44
Paranoid conditions	3	9	12
Psychoses with encephalitis	1	2	3
Taboparesis	1	..	1
Psychosis due to alcohol	1	..	1
Toxic Psychosis (post-operative)	..	1	1
Epilepsy with psychosis	1	..	1

* The manic-depressive group disposed itself into the following types:

	Men.	Women.	Total.
Depression	18	22	40
Manic	7	2	9
Circular	1	..	1
Mixed	..	1	1

In the handling of cases, naturally, special circumstances implicit to the college situation must be taken into consideration. In

the first place, there is the student himself, usually barely emerged from adolescence, often actually a minor. He is away from home and immediate family contact, and beyond the range of care facilities available in his own community. More than occasionally, he has no directly interested relatives and not infrequently is greatly handicapped as to financial and social resources. Furthermore, he is engaged in a very special and exacting commitment, his particular academic project, with a special type of institution, the college or university. To him, in turn, this institution to which he has entrusted himself or has been entrusted, stands in a position of a certain responsibility. This responsibility in a formal sense is naturally rather sharply limited, but in an informal or human sense is by no means so, in fact comes to be of all the greater moment because of its very indefiniteness. In addition, there is the obligation to families and to the institution itself in the light of its own functionality and the standards and requirements it must maintain.

Bearing on the above, through experience, certain practical indications have crystallized themselves as essential to adequate procedure. First, in addition of course to effective contact with the current clinic roster, including within itself as many cases as possible in which serious developments are expectable, immediate attention is given to all calls and referrals relating to potentially acute situations. This, in spite of the fact that a number of these may turn out to be of no great urgency or significance technically. Careful and thoroughgoing examination and observation is initiated at once and proper control measures established, with provision for bed care in the Health Service Infirmary, if in any way indicated.

If the problem as explored discloses itself as really significant clinically, the families or equivalent connections are notified at once, as well as the proper University representatives. Likewise, arrangement is made, if at all possible and indicated, for some responsible relative or friend to come to the University to discuss the situation personally, to share responsibility, participate in the working out of a plan and to be available for removal, if such comes to represent the most constructive disposition. If the coming of such a person is not feasible or indicated, contact as to developments and indications is maintained in other ways.

Actual plans and dispositions naturally cover a wide range. Thus, it may be desirable in a number of instances to transfer the patient elsewhere, nearer home, for appropriate treatment or hospitalization. Again, it may be advisable under certain circumstances to arrange for special hospital or sanitarium care locally with affiliated institutions, as the University Hospital. In this connection, it should be stated that besides unlimited out-patient attention, the Health Service fee* ($15 annually) entitles the student to 30 days of Infirmary care without extra cost, or an allowance of $4.00 per day for the same period toward expenses incurred in affiliated medical units.

On the other hand, it might prove best to institute Infirmary care with later resumption of University responsibilities and the maintenance of out-patient contacts with the mental hygiene unit; or to proceed upon an intensive out-patient basis directly. In such cases, as well as all others returning from treatment or care elsewhere, required modifications must be made in work and activity loads, both academic and extra-curricular, and instructors apprised as to implications important for them in their relationships with the individual students.

Other arrangements must be made pertaining to the student's welfare also, as, for example, provision for special financial aid and social and recreational outlets. All this requires much consultation with faculty members and the various student welfare units, as well as with parents and relatives, and physicians or medical agencies elsewhere. This, in addition to the attention necessitated for the purely clinical handling of the case, comes to be very time-consuming and, with a student population drawn from all parts of the world, often quite involved. However, it is absolutely essential if the presenting situation is to be dealt with in the only proper way, that is as an individual-social entirety. Furthermore, the above is a type of activity in itself difficult and trying, conceding little to set time arrangements or personal convenience, and demanding the utmost in energy, patience, thought and understanding.

Finally, individuals are re-admitted to the University only on the basis of very careful review and follow-up through the psychiatric unit. The governing principle here of course, as with all

*Included in total tuition charge and subject to waiver under special circumstances.

cases, is that of encouraging only those to go on as seem capable, with reasonable attention, of satisfactory University performance, with benefit and meaning to themselves. That is, it is to be appreciated that the college primarily is an educational institution and not a hospital or rehabilitation unit for the grossly disabled.

As to actual clinical procedure, as long as treated on a University basis 89.4 per cent of our series were given infirmary or out-patient care, or both. For the remaining 10.5 per cent, in addition, varying periods of special hospitalization in affiliated institutions were required. With respect to course followed, 61.4 per cent were able to remain in school sufficiently long at least to complete the specific term of residence, 7.0 per cent withdrew for varying periods, later returning, and 31.5 per cent discontinued attendance and did not return. In one case suicide occurred while in residence.

In sixteen cases, subsequent clinical episodes or exacerbations occurred while in school. Thus, in ten instances there was one recurrence of difficulty, in two cases 2, in three cases 3 and in one case 4. In these cases, chiefly manic-depressive, as a result of the establishment of contact and the development of insight, later episodes were in the main easier to deal with and often less serious in their effects. In this relation, it should be pointed out that for the definitely expectable milder situations of psychotic type, as well as other case types of course, a college unit often can do much with little or no interference to the academic aspect. This is true particularly in view of the length of contact afforded, theoretically the duration of the college course. In this way, really effective fundamental orientation and reeducation may be brought about, of significance not only respecting the specific clinical episode but with reference also to the life course as a whole.

Also, because of its special facilities, the unit was able to continue, at least for a period, certain cases for which at the time, considering the clinical facts and the University situation, withdrawal with care elsewhere had such resource been available, represented the ideal solution. Further, aside from the time outlay by the psychiatric personnel, relatively negligible in the light of its total activity, this was possible without significant, if any interference or extra load to the University mechanism as such.

Practically, this is rather an important point, as it seems only reasonable, in terms of the long range view, that agencies dealing with human material be prepared, within limits, to step outside their technical precincts to protect emergency situations otherwise without resource, and until some other constructive recourse becomes available. At any rate, it is surprising how much of a humanly conservational nature has been possible in this type of situation, without undue tax to the University and with actually positive academic result.

Respecting schizophrenia, it is important that in the college where there is opportunity for close and continued contact with a selected younger group over a relatively long period, cases may be detected extremely early, before the establishment of traditional classical patterns, and when the process may be less fixed and unreversible. At any rate, it is noteworthy in such cases that where prompt and sufficiently prolonged treatment, preferably of sanitarium type, is carried out, surprisingly good results may obtain. Here the importance of the time element with reference to the initiation of treatment cannot be too strongly stressed. Of our twenty very early cases,* in five where, to our knowledge, there was good cooperation and adequate management was immediately possible, and where subsequent information has been available, really very gratifying outcomes occurred. In this relation, incidentally, there seems to be considerable virtue per se in the principle of the scientifically protected or test-tube environment promptly applied, in addition of course to other therapeutic indications and procedures, calling to mind in analogy the importance of immobilization for fractures. In our cases, it should be mentioned, pharmacological shock therapy had not been employed chiefly, naturally, because of its still experimental status.

Clinical results in our series, up to the time of the last University contact within the seven-year period, are tabulated in Table VIII.

* Duration, as far as could be determined in these cases, was three months or less. Course for the entire series of 20, on the basis of last University contact and available follow-up information has been as follows: 4 unimproved; 6 improved; 5 very much improved or clinically seemingly recovered; 5 no information subsequent to last contact with University.

Sixteen of the above are still in attendance at the University. Also, the condition of eleven * listed in the first two groups had been better in the interim between the occurrence of the original difficulty and the time of the last contact.

Further, in 51 instances in the unimproved group and one of the improved, the persons concerned had withdrawn from the University, or otherwise terminated contact, while in the acute or active phase of their respective conditions. The present status

TABLE VIII.

	No.
Unimproved	58
Schizophrenia	30
Manic-depressive psychoses	18
Paranoid conditions	6
Psychosis with encephalitis	2
Epilepsy with psychosis	1
Taboparesis	1
Improved	29
Schizophrenia	8
Manic-depressive psychoses	15
Paranoid conditions	5
Psychosis with encephalitis	1
Very much improved or recovered	27
Schizophrenia	6
Manic-depressive psychoses	18
Paranoid condition	1
Psychosis due to alcohol	1
Toxic psychosis (post-operative)	1

in these cases, to the extent information has been available, is indicated in Table IX.

From both preceding tables, as might be anticipated, it would seem that clinical outcomes have been more satisfactory with the manic-depressive group than with schizophrenia and paranoid conditions. However, taken as a whole, the clinical results have been, to say the least, distinctly favorable.

* The diagnoses in these 11 cases are as follows:

Manic-depressive psychoses	9
Schizophrenia	1
Paranoid condition	1

Duration of contact with the mental hygiene unit while at the University is summarized in Table X.

As might be expected, the psychotic series differs somewhat from the distribution for student clients in general, chiefly in that cases tended to be seen over longer periods.

TABLE IX.

	No.	
Unimproved		15
Schizophrenia	7	
Manic-depressive psychoses	4	
Paranoid conditions	3	
Psychosis with encephalitis	1	
Improved		10
Schizophrenia	4	
Manic-depressive psychoses	6	
Greatly improved or recovered		15
Schizophrenia	7	
Manic-depressive psychoses	6	
Paranoid condition	1	
Epilepsy with psychosis	1	
No information available		12
Schizophrenia	8	
Manic-depressive psychoses	3	
Psychosis with encephalitis	1	

TABLE X.

	Psychotic series, per cent.	Total * student roster per cent.
One year	58.7	80.8
Two years	26.3	13.1
Three years	8.7	4.5
Four years	6.1	1.4

Academic averages up to the close of the seven year period were satisfactory † in 44.7 per cent, fair in 23.6 per cent and unsatisfactory in 14.9 per cent. Thirteen and one-tenths per cent did not remain in school long enough to secure credits, and in 3.5 per cent records were incomplete. The above, of course, refers to total

* Based on four years' experience with a series of 2301 individuals during the years 1930 through 1934.

† Satisfactory, C+ and over.
Fair, C to C+.
Unsatisfactory, below C.

records, that is, includes such grades as might have been secured prior to psychotic development as well as since. Further, 16 students were on probation once, six twice, two three times and one four times. Also, 12 students were on probation at the time University attendance was discontinued. However, such status does not apply to any of the group at present in attendance. In addition, 30 students received degrees and 16 (14.0 per cent) achieved scholastic distinction in the sense of election to the various honor societies, scholarship awards or special mention for

TABLE XI.

	No.
1. Graduated *	27
2. Continuing in university	16
3. Not at present in attendance but with no actual contra-indication to same on basis of university requirements	13
From information available, the following appear to represent the chief reasons for these discontinuances:	
3 Scholastic situation not encouraging, or actually unsatisfactory, though within official limits.	
4 Accepted positions.	
1 Financial.	
1 Health (physical).	
4 No specific reason assignable.	
4. Unable to continue in university	58
35 because of psychiatric status.	
15 because of psychiatric status and scholarship or other administrative reasons.	
2 because of scholarship.	
6 deceased (2 suicides).	

* In this category should also be included three individuals, listed in Group 2, who while still continuing in the University, have already received degrees.

high grade averages. This is really striking in view of the greatly handicapped nature of the group clinically, not to mention the various other exigencies and difficulties expectable in connection with the college undertaking.

The final terminations or outcomes with respect to University status, through the first semester of 1937-38, are shown in Table XI.

Diagnostically, these groups are constituted as in Table XII.

Respecting the above, as brought out in the discussion of clinical outcomes, results appear better for the manic-depressive group than for schizophrenia and paranoid conditions. However, for the total series, it is indeed interesting that as high as 37.7 per cent graduated or are continuing in attendance, with an additional 11.4 per cent, as far as our knowledge extends, able to continue. This, certainly, is a rather striking commentary as to the aca-

TABLE XII.

	No.
1. Graduated:	
Schizophrenia	8
Manic-depressive psychoses	13
Paranoid conditions	4
Psychosis with encephalitis	1
Psychosis due to alcohol	1
2. Continuing in university:	
Schizophrenia	4
Manic-depressive psychoses	11
Paranoid condition	1
3. Not at present in attendance but with no actual contra-indication to same on the basis of university requirements:	
Schizophrenia	3
Manic-depressive psychoses	8
Paranoid condition	1
Toxic psychosis (post-operative)	1
4. Unable to continue in university:	
Schizophrenia	29
Manic-depressive psychoses	19
Paranoid conditions	6
Psychoses with encephalitis	2
Epilepsy with psychosis	1
Taboparesis	1

demic potentiality, among other possibilities, of a group so handicapped psychiatrically, at least in the traditional sense. Albeit, at this point it should be stated too, that despite many good personal and scholastic outcomes, in not a few instances the original academic undertaking, in itself or with respect to specific choice of institution was not, considering all aspects, a truly constructive move. This, of course, serves again to stress the importance of the selection process regarding prospective students.

In conclusion, while admittedly psychoses do not occur with any great frequency in student populations, they do represent a

definite contingency which the college must appreciate and be prepared to meet. Also, such occurrences present rather special implications as to procedure and handling. However, properly approached and with adequate facilities, the problem can be satisfactorily dealt with, often with excellent long-term result to the individual and positive outcome academically.

Furthermore, in the college situation an almost unique opportunity is afforded for the detection, study and treatment of psychotic conditions very early in their course, actually in the period of their absolute incipiency. In this, naturally, there should be much of benefit to the individual and, respecting the schizophrenic reaction type particularly, to the science of psychiatry itself. In addition, the college context is especially an auspicious one with respect to the care of susceptible individuals and syndromes of pre-psychotic type, with real possibility as to actual prevention, that is, a realization truly of the mental hygiene principle.

Finally, a very important implication of this inquiry, perhaps broadly viewed, its most important, is in emphasis of the significance of careful selection of applicants for admission, including clinical as well as general and academic criteria, with proper attention to those who are admitted. This, naturally, should apply not merely to situations where there may be psychotic possibility but to the human or personality aspect generally. In this way, through the affording of a student personnel most adequate to participate in the process, the college or university may be furthered in its fundamental objective, the supplying of the means and the inspiration for higher education. Here, with others in the college body, the psychiatrist to the degree that he is competent is in a position, unquestionably, to render a vital and far reaching service.

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A STUDY OF THE INFLUENCE OF EMOTIONS AND AFFECTS ON THE SURFACE TEMPERATURE OF THE HUMAN BODY.*

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The Problem.

Occasionally clinicians see patients with temperatures above or below the usual normals and are puzzled by the apparent absence of somatic disease to account for such findings. Opinion is somewhat divided as to the supposed mechanism involved which may include psychogenic fever or the less often thought of psychogenic hypothermia. Despite the extensive literature relating to these subjects, the writers have been urged to the further study of the problem by their experiences with unexplained fever or hypothermia among certain patients, by a knowledge that surface temperatures are highly responsive to the external as well as to the internal environment, and by the advent of new thermometric techniques.

Historic Sketch.

In mythology it is recorded that under certain conditions a human body thrown into a tank made the water boil. For centuries unusual body heat has been associated with disease. This served to establish the loose qualitative concept of hyperpyrexia, hyperthermia, or fever. The word "fever," from the Latin, meaning "to boil," is usually defined as an abnormally high temperature. Obviously, the necessity for defining methods of measuring, duration, and the degree of heat considered to be abnormal has afforded much stimulus for observation and research. Thus far, no entirely satisfactory definition of fever has been established, although several practical

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ones are in use. The ancients perhaps gave the first attempts at thermometry when they painted the body with mud, suspecting the areas first to become dry as possibly being over the diseased part.[1] Crude water thermometers began to appear at the end of the sixteenth century. In the last few years the mercury thermometer has given way to more delicate electrical methods (thermocouple and radiotherm), some of which are almost continuously recording.

Up to 1898 Pembrey [2] had given the most comprehensive discussion of factors that affect the temperature of man and other animals. He presented data for different parts of the human body, for warm- and cold-blooded animals, and for the effect of environment. Diurnal variations were given. The influence of hibernation, age, muscular and mental work, food, sleep, sex, race, climate, season, baths and drugs was discussed, with data. The changes in temperature of fowls during the brooding period, when their disposition or emotional life is greatly altered, were noted. He studied the temperatures compatible with life and the possible mechanisms, including the nervous system, which regulate temperature. He felt that emotions such as those associated with blushing, or shame, affected the vasomotor system to change skin temperatures, but that similar emotions might have diametrically opposite effects in different individuals. After quoting from the work of numerous experimenters he concluded that a so-called "heat center" in the brain had not been proved.

Benedict and Snell [3] in 1902 showed that the cavity temperatures of the human body taken every 4 minutes for several days are rarely the same. They also found a considerable diurnal variation. Benedict and Slack [4] have ably demonstrated the temperature gradients from the warmer interior to the cooler surface and have reported variations that may occur in both over a considerable time. Claus and Bingel [5] have shown that temperature differences as great as 1° C. may be found at symmetrical points on the body surface in normal persons at rest. Needless to say, the fluctuations of temperature over the surface are greater and more fleeting than in the deep cavities, being much more responsive to the external environment, and presumably to the many factors that may constitute the internal one.

Hysterical Fever.

Before the discovery of bacterial causes of disease, the concepts of fever and disease were usually closely associated. After the discovery of bacteria there was more opportunity to speculate on those factors, other than infection, which could cause fever. During the last half of the nineteenth century, before thermometry was in general use, several French writers associated fever with certain cases of hysteria. The inference was drawn that, since symptoms usually seen in febrile disease were observed in hysterical patients (mostly women) with bodily warmth suggesting fever, there was such a condition as hysterical fever. Disputes arose as to the possibility of such "feverish states" being caused by inflammation of the sexual organs. Briquet [6] was the first to recognize that the fever in hysterical patients was not caused by inflammatory disease and, although he was aware that such cases were rare, he gave reports of some patients who recovered from illnesses so severe that they might have been mistaken for typhus or meningitis. However, Landouzy [7] claimed that the fever of Briquet's patients was caused by convulsions. Other writers had different explanations for such feverish states.

Sarbo,[8] in a comprehensive paper in 1891 on hysterical fever in which he reported cases (chiefly women) with temperature readings, concluded that there may be an abrupt rise, or a continuous fever, as a manifestation of hysteria. The fever in his reported cases seldom went above 38.5° C. (101.3° F.). He presented an extensive bibliography which showed how much thought had been devoted to the subject up to that time.

Recent Literature on Clinical Observations.

As thermometry became more general and more accurate, the correlation of fever with various pathological conditions became possible. Infections are undoubtedly the greatest cause of fever. Neoplasms, traumatized tissue, infarcts, foreign proteins, and degenerative processes are known to cause elevations of bodily temperature. Edema, or angioneurotic edema of the brain, allergy of the nervous system, and dehydration have been postulated as rare causes of fever. The finding of slight elevations in temperature, difficult to explain on any of the previously mentioned bases, has

raised the question of neurogenic and neurotic, or psychogenic fever. Alt and Barker [9] followed 57 of such puzzling cases to determine the outcome and concluded that infection or malignancy were ultimately responsible for the fever in a large percentage. Kintner and Rowntree,[10] on the other hand, followed 100 patients with slight elevations in temperature and, since many recovered from the fever, concluded that the cause is deserving of more study. Riemann [11] presented in detail the history of a case of "habitual hyperthermia" related to the menstrual cycle. Falcon-Lesses and Proger [12] reported convincing proof of the effect of veni-puncture and other examination methods on the temperature of a young diabetic woman under observation over a considerable time. Mohr [13] and Deutsch [14] mentioned a number of similar examples. The latter writer felt that psychogenic fever was conditioned by a disturbance in heat elimination. A stenographer, used as a subject for the study of normal temperature in the physiology laboratory,[15] suddenly had an unexpected 8° F. fall in an extremity, persisting for three to four minutes. When questioned, she stated that at the moment of the change she remembered having forgotten an important detail for her employer and knew how angry he'd be. The influence of hypnotic suggestion on the temperature of the body has been reported.[14] In some hypnotic subjects the changes were so slight as to fall perhaps within the range of normal variability. Certain religious practices called "Thumo," or concentration, among the people of Tibet are said to raise body temperature to a feverish state.

With the aid of very special apparatus, Wolff and Mittelman [16] studied the effect of emotions on the skin surface temperature of the fingers of the left hand and concluded that marked reduction in surface temperature of the extremities usually takes place, even below environmental temperature. Outspoken vasomotor changes in the hands, resembling Raynaud's syndrome, occurred in one of their subjects.

Definition and Mechanism.

Body temperature is an ephemeral equilibrium which happens to be present at any given moment and at a designated locus when the variable, heat production, is offset by another variable, heat loss. The optimum conditions for the accumulation of heat are increased

heat production and decreased loss, although either of these factors alone may be responsible for it when the other is constant.

Heat production is mediated largely through tissue oxidations, chiefly in muscles, but to some extent in glands and other structures. Motility, inhibition, tone, and less obvious chemical changes in muscle are the chief sources of heat production and are, indeed, so closely allied to emotion as to give to the word itself the definitional coloring of something growing out of motion. In paralyses, such as those produced by transection of the cervical spinal cord, heat production is markedly altered and heat control all but lost.[17] According to Vierordt,[18] heat loss in man is mediated through urine and feces 1.8 per cent, expired air 3.5 per cent, evaporation from the lungs 7.2 per cent, evaporation from the skin 14.5 per cent, radiation and conduction from the skin 73 per cent. By far the larger portion of heat loss is through perspiration, respiratory activity, and vasomotor reactions in the skin—all closely allied to emotional or affective life. No study of mechanism could be complete without knowledge of the exceptional work of DuBois [19] and his co-worker, whose analysis of vaporization, radiation, and convection give one an idea of the complexity of the problem. He has pointed out that "shivering" as in a chill and "muscular tensing" of emotion are involuntary, in contrast to exercise which is voluntary. All generate heat, but the course of its dissipation following each may be somewhat different—an important factor in the mechanism of temperature variation on or in the body.

Heat Regulation in Children.

In children, in particular, emotion has been associated with slight elevations in temperature. Oppenheim [20] noted such tendencies to fever after excitement in nervous children. The effect of a thrilling cinema has been known to elevate body cavity temperature. Van Der Bogert and Moravec [21] made an interesting study showing the positive influence of excitement, and reversing the sleep curve, on body temperature. From a physiological standpoint, it is known that at birth our temperature regulatory mechanism is poorly developed and the body stands in need of much protection. Prematurely born infants are even less able to regulate their temperatures, making the use of the incubator almost a necessity. Children doubtless out-

grow this heat-regulatory handicap slowly and at varying rates, which may be more significant in the development of the adaptive capacities than we now recognize.

Heat Regulation in Schizophrenia.

It has been postulated that in the biogenic failure of development known as schizophrenia there might be a heat-regulatory defect indicative of this general failure of development. Carmichael and Linder,[22] after a study of oral and rectal temperatures in normal and schizophrenic subjects, concluded that the heat regulatory mechanism in the schizophrenics as a group may be different from the normals. Cameron,[23] in a different form of experiment, inferred that heat production in schizophrenics is reduced, but that heat regulation is more active than in normal controls. Gottlieb and Linder,[24] in another method of study, assert that schizophrenics are "unable to comply normally with homeostatic principles concerned with the regulation of heat." Finkelman and Stephens,[25] in an interesting study, conclude that heat production in response to cold is less in schizophrenics than in normals, that it is not maintained, and usually is not associated with the hyperemia which one is so apt to see in normals. They further give as their opinion that in schizophrenia there may be a physiological disturbance in the hypothalamus.

The Relation of Heat Regulation and Allied Phenomena to the Nervous System.

The influence of lesions of any part of the nervous system on bodily temperature has long been a subject of great interest. The frequency of hyperthermia among patients with intracranial vascular lesions cannot always be accounted for on the basis of infection. Cobet [26] has reviewed briefly some of the history of knowledge bearing in these directions, including the observations on unilateral fever and unilateral hypothermia associated with capsular lesions, and the extreme variability of surface temperatures that may be found in syringomyelia.

Following the demonstration by Claude Bernard [27, 28] that the sympathetic nervous system subserves the function of vasoconstriction, numerous investigators including Leriche,[29] Royle,[30] Brown

and Adson,[31] Herrick, Essex, and Baldes,[32] and others, have shown the vasodilator effect of cutting the sympathetics. This has been revealed by increased blood flow on the side of the transection, elevation of surface temperature, and diminished or abolished sweating in a portion of the extremity deprived of sympathetics. Much speculation has arisen as to possible brain representation for such sympathetic fibers.

Brickner [33] investigated the influence of emotion on the pilomotor response of two hemiplegics and concluded that certain cortical cells may serve to inhibit thalamic and hypothalamic cell centers for pilomotor reactions. He cited relevant literature. Bucy [34] studied the interesting temporary abolition of radial pulse and blood pressure in the affected arm soon after the onset of a right hemiplegia in a woman, the victim of a severe head injury. The affected arm was cold and cyanotic, but recovered within ten days. Kennard [35] reported the effect of pre-motor unilateral cortical lesions in monkeys. Contralateral skin temperatures were observed to be below those of the normal side. The affected side did not respond reflexly as quickly as the normal to elevations in environmental temperature. Transitory edema and failure to sweat were also noted on the affected side. This seems to be substantial experimental evidence for cortical representation of fibers that affect the sympathetic system.

Ranson, Fisher, and Ingram [36] have recently reviewed the literature on the temperature regulatory function of the hypothalamus and give the results of their own experimental work in producing lesions in the hypothalamus of monkeys. They conclude that destructive lesions "may cause either transient hyperthermia or more prolonged hypothermia." The hypothermia tends to recover after a time. Such recovered animals were usually unable to adapt to extremes of temperature as well as formerly, suggesting the condition one sees sometimes after heat-stroke. The animals were not especially studied for the influence of emotions on surface temperatures or vasomotor responses, but Ranson,[37] in an earlier study bearing on this subject, drew these conclusions: "It may be said that the activity of the hypothalamus manifests itself in two ways. As a part of the hypo-thalamico-hypophyseal system it controls the utilization of water and possibly also of fat and sugar in the body. Lesions so placed as to interrupt the tract joining it with the hy-

pophysis cause a large and permanent increase in the water exchange of the body, a true diabetes insipidus. Second, by virtue of its intimate connections with the sympathetic system, it is able to initiate widespread visceral reactions of the type seen in fear and rage. Its stimulation produces all the signs of intense emotional excitement, and, when properly placed lesions are made within it there is a dampening of emotional expression and even somnolence."

Magoun [38] has recently presented evidence to show that localized heating in the diencephalon activates the heat loss mechanism of sweating and polypnoea.

Techniques and Method of This Study.

The advent of new techniques revivifies the importance of old problems. The mercury thermometer, a most useful instrument of precision, is valuable chiefly for measuring maximum temperatures of the body cavities, but not their fluctuations. Various electrically controlled machines are especially valuable for measuring surface temperature. Two of these were available to us: one (photoelectric) very recently developed by the General Electric Company, which is continuously recording; and the electromotive thermometer, which permits temperatures to be taken from four or more points in rapid succession. The micromax machine (Leeds and Northrop), because of a 53-second interval between temperature recordings, proved too inflexible for the rapid changes which may occur. The Hardy [39] radiometer, perhaps the most sensitive, and continuously recording from one area, was not available to us. A special type of plethysmograph [40] was also used, which gave very little evidence (usually vasoconstriction, if any reaction) of correlation between emotional states and the volume of a finger. Ellis and Weiss [41] have studied this problem in hemiplegics by the more direct method of blood flow, but not under the influence of emotion.

From an active clinical neurologic and psychiatric service some opportunities were utilized to learn the effect of emotions and affects on surface temperature. Persons were studied who were known to become emotional when preoccupied with certain aspects of their personal history. Opportunities were presented for studying the variations in the course of a psychosis. The effect of weeping itself was thought to bear on this study. Some effects of emotions on the two sides in a hemiplegic were followed. Finally, the effects of

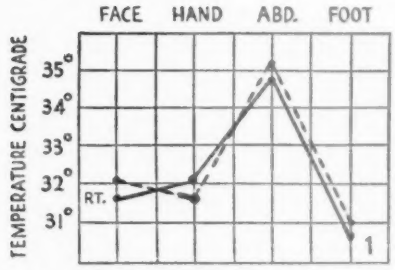
intracranial lesions of recent and more remote origin on the temperature of the two sides, while the subjects were resting quietly, were noted. The largest number of readings was made with the electromotive thermometer.[42] It enabled readings to be made from four points in fairly rapid succession by means of a switch. Except in the case of hemiplegics where readings were made on both sides, they were made on the right side in right-handed persons at a point on the cheek halfway between the external canthus and the angle of the mouth; on the dorsum of the hand; three inches lateral to the umbilicus; and on the dorsum of the foot. (These are designated on the charts: FACE, HAND, ABD., and FOOT, respectively.) All patients had been resting uncovered on a bed for half an hour before the tests, in a comfortable, but not constant-temperature room. Patients were told that a special electrical thermometer was being used to take their temperatures. Control readings preceded any experimental observations. The results of these studies are presented in graphic form, together with a very brief summary of the patient's history. Broken lines indicate measurements under emotional or special affective influences. The graphs are presented in serial order according to the following table, indicating the reaction types tested:

Diagnostic Reaction Type.	No.
Depressive	1, 2, 9, 7, 11
Schizophrenic	6
Toxic-infectious (nearly recovered)	10
Psychoneurotic (major hysteria)	5, 3
Organic	8, 18
Right hemiplegia (vascular) without aphasia	4, 14, 15
Right hemiplegia (vascular) with motor aphasia	13, 12 (19 acute)
Left hemiplegia	16, 17
Psychoneurotic	B. H.

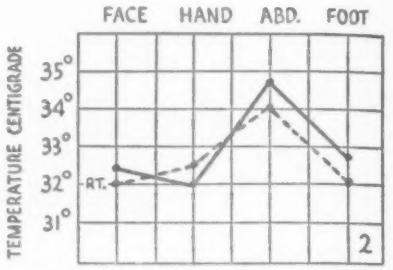
One patient, B. H., showed such unusual capacities to become emotional that her temperature was taken (from right cheek) continuously by the photoelectric recorder (General Electric) for a considerable time while under various emotional influences.

DISCUSSION.

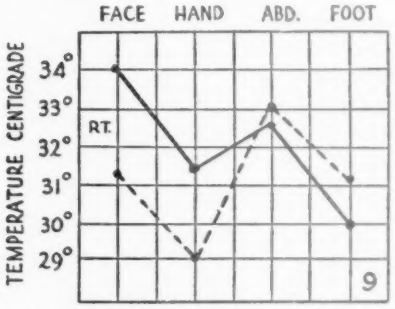
The greatest definite effects of emotion, or affect, seem to have occurred in a schizophrenic (No. 6) and a major hysterical patient (No. 3) in which there was elevation of temperature—more espe-



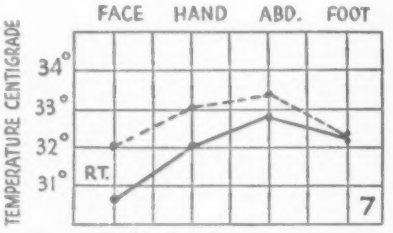
No. 1. C. E., single woman, 36; testing done three weeks before rather rapid recovery from a *depression* (*recurring*) which began six months previously. Solid line—readings while calm and comfortable. Broken line - - readings a few minutes after above while thinking of unpleasant aspects of life about which she said, "they did not affect my feelings as they usually had done." Room 23. 9° C. Mouth, 37° C. Rectal, 37.4° C.



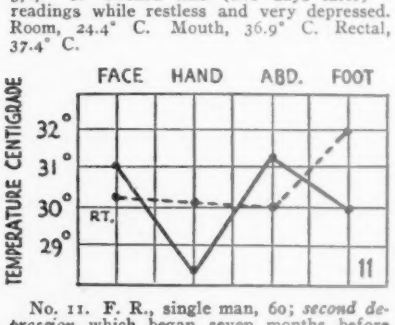
No. 2. W. H., woman, 35, separated; in *second depression* with hypochondriacal and stuporous features, onset two years previously. Solid line—readings while seemingly in a peaceful state. Broken lines - - readings a few minutes later on hearing bad news. Room, 23.6° C. Mouth, 36.8° C. Rectal, 37.4° C.



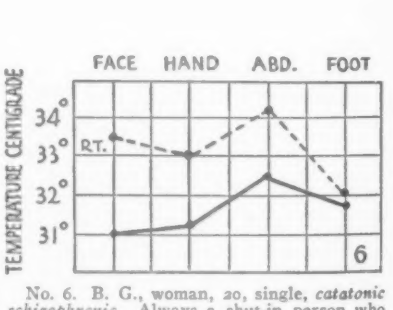
No. 9. R. L., single woman, 42; *depressed* after hysterectomy for fibroids and death of mother 3 years previously. Much weight loss. Solid line—readings while resting quietly. Room, 26.6° C. Mouth, 36.9° C. Rectal, 37.7° C. Broken line (two days later) - - readings while restless and very depressed. Room, 24.4° C. Mouth, 36.9° C. Rectal, 37.4° C.



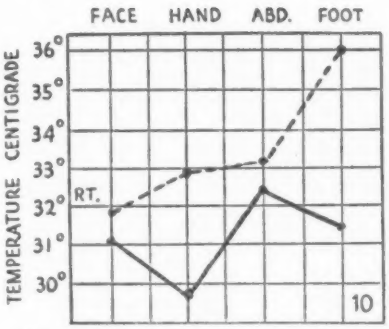
No. 7. P. M. J., widow, 53; *involution melancholia* with onset five months previously. Always peculiar and shut-in. Solid line—readings while resting seemingly peacefully. Broken line - - readings while weeping and few minutes later. Room, 22.8° C. Mouth, —. Rectal, 37.1° C.



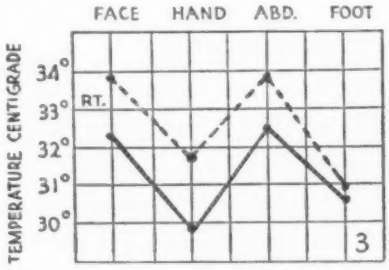
No. 11. F. R., single man, 60; *second depression* which began seven months before at death of brother. Ideas of sin and guilt. Alcoholic excesses. Cataracts. Solid line—readings when quiet and cooperative but somewhat depressed. Room, 25.2° C. Mouth, 36.4° C. Rectal, 37.2° C. Broken line - - readings 9 days earlier when very depressed and agitated. Room, 24.4° C. Mouth, 36.4° C. Rectal, 37.2° C.



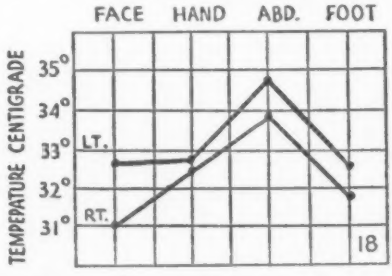
No. 6. B. G., woman, 20, single, *catatonic schizophrenic*. Always a shut-in person who a week previously began to become noisy, excited, hearing God's voice. Flexibilitas cerea. Staring. Solid line—readings while quiet and restful. Broken lines - - readings a few minutes later while preoccupied with religious topics. Room, 22.8°. Mouth, —. Rectal, 37.7° C.



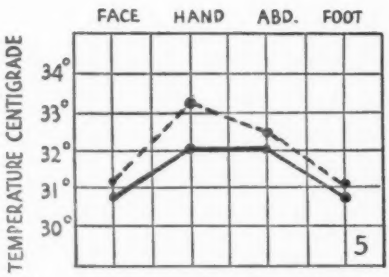
No. 10. F. I., woman, 36, married; five days after subtotal thyroidectomy thought people were talking about her, wept, fearful, refused to eat. Uncommunicative. Fever Leukocytosis. Abscess of wound drained. Pus in urine. *Toxic psychosis.* Solid line—readings 27 days after onset when much improved. Room, 23.7° C. Mouth, 37.5° C. Rectal, 37.5° C. Broken line - - readings three days earlier when somewhat apprehensive. Room, 26.5° C. Mouth, 37.4° C. Rectal, 37.4° C.



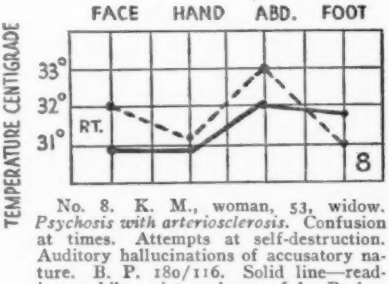
No. 3. D. F., man, 29, married; *major conversion hysteria* with dysbasia, unconscious spells, and pseudoanaesthetic area of left leg of several months duration. Solid line—readings while resting peacefully. Broken line - - readings a few minutes later while thinking of unpleasant problems of his life during which he said, "it makes me feel as if a death has taken place." Room, 26.1° C. Mouth, 37.1° C. Rectal, 37.2° C.



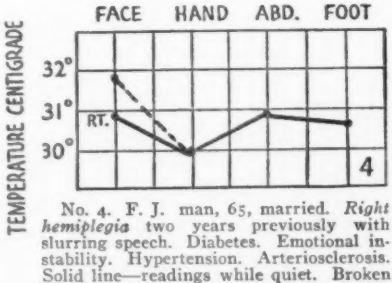
No. 18. K. J., woman, 58, separated; five years before suffered a slight *weakness* and numbness and awkwardness of *right side.* Memory impaired. Not aphasic. Hypomania. Hypertension. Solid line—readings on both sides while at rest. Room, 24.4° C. Mouth, 36.6° C. Rectal, 37.2° C.



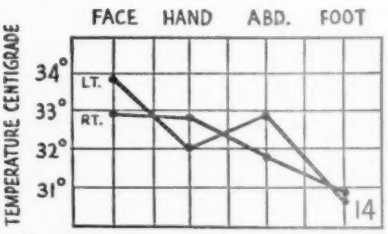
No. 5. K. R., woman, 25, married; *major conversion* hysteria with pseudoparalysis (motor and sensory) of lower extremities of one and one-half years duration. Solid line—readings while at rest. Broken line - - readings a few minutes later while preoccupied over unpleasant matters. Room, 23.4° C. Mouth, 35.5° C. Rectal, 37.2° C.



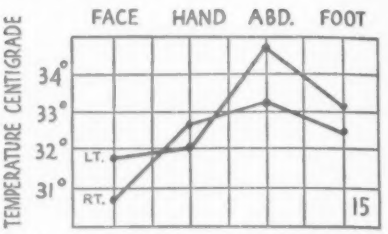
No. 8. K. M., woman, 53, widow. *Psychosis with arteriosclerosis.* Confusion at times. Attempts at self-destruction. Auditory hallucinations of accusatory nature. B. P. 180/116. Solid line—readings while quiet and peaceful. Broken line - - readings a few minutes later while preoccupied with distressing thoughts. Room, 24° C. Mouth, 37° C.



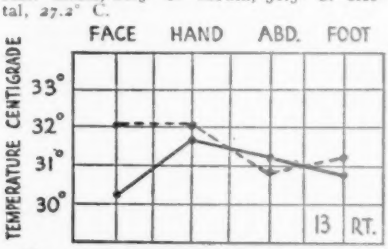
No. 4. F. J. man, 65, married. *Right hemiplegia* two years previously with slurring speech. Diabetes. Emotional instability. Hypertension. Arteriosclerosis. Solid line—readings while quiet. Broken line - - readings a few minutes later after weeping. Room, 21.6° C. Mouth, 37° C. Rectal, 37.2° C.

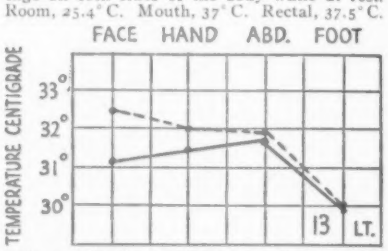


No. 14. G. S., man, 48, married; 35 days previously suffered a *right hemiplegia*. Hand affected most. Not aphasic. Solid lines—readings on both sides of the body while at rest. Room, 20.5° C. Mouth, 36.5° C. Rectal, 37.2° C.

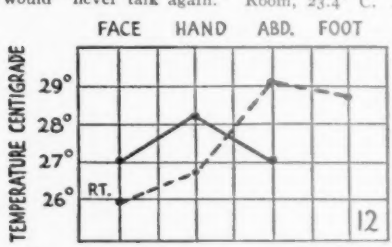


No. 15. L. I. P., woman, 68, married; nine months previously suffered a severe *right hemiplegia* with no return of function. Not aphasic. Hypertension. Solid lines—readings on both sides of the body while at rest. Room, 25.4° C. Mouth, 37° C. Rectal, 37.5° C.

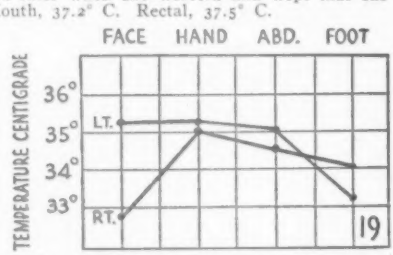




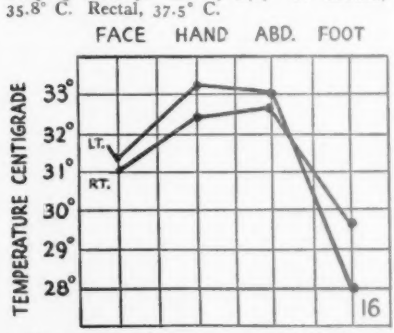
No. 13. T. L., woman, 42, married. Four months previously developed a *right hemiplegia* with *motor asphasia*, right hemianopsia, and partial astereognosis of right hand. Hypertension. Solid line—readings when resting peacefully. Room, 23.4° C. Mouth, 36.7° C. Rectal, 37.3° C. Broken line - - readings nine days later when she worried and wept that she would "never talk again." Room, 23.4° C. Mouth, 37.2° C. Rectal, 37.5° C.



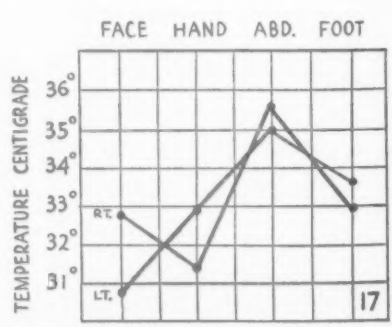
No. 12. B. N., woman, 65, widow; six years before had a *right hemiplegia* with *motor aphasia* from which she did not recover. Blood serology positive. Spinal fluid serology negative. Hypertension. Solid line —readings while resting peacefully. Broken line - - readings a few minutes later while weeping bitterly. Room, 24.4° C. Mouth, 35.8° C. Rectal, 37.5° C.



No. 19. S. B., woman, 56, widow. Suffered a sudden *right hemiplegia* four days previously with *aphasia*. Diabetes. Spinal fluid clear. Solid lines—readings on both sides a few hours before death when stuporous and with rising fever. Room, 22.8° C. Mouth, —. Rectal, 39.5° C.

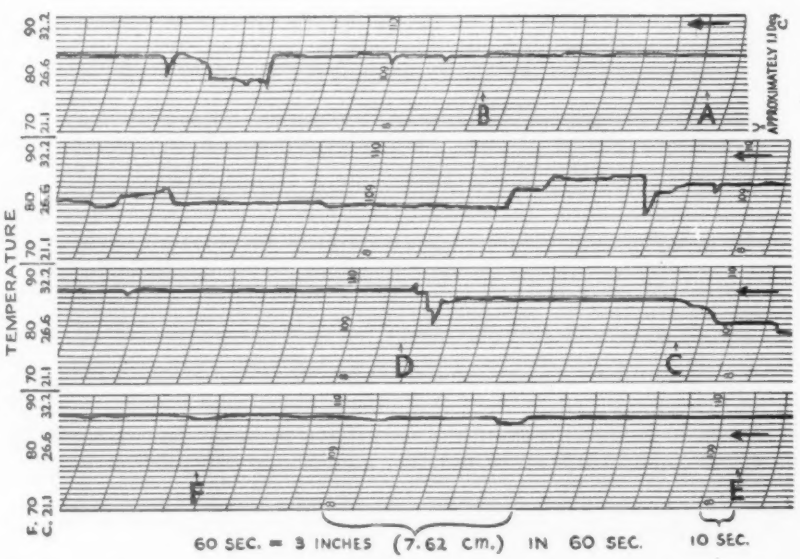


No. 16. G. S., woman, 55, widow. Onset 14 months previously with pain and *weakness of left side*. Leg worse than arm. Hypertension. Solid lines—readings on both sides after a period of sleep. Room, 21.5° C. Mouth, 36.6° C. Rectal, 37° C.



No. 17. S. S., woman, 54, married. Onset of *left hemiplegia* 22 months previously. Not aphasic. *Psychotic* at times. Confused. Belligerent. Noisy. Solid lines—readings on both sides while resting quietly. Room, 21.6° C. Mouth, 36.6° C. Rectal, 37.4° C.

cially in the upper half of the body. A depressed patient (No. 9) and one presenting a toxic-infectious reaction (No. 10) gave readings worthy of more study. Weeping produced definite surface temperature changes in one patient (No. 12) who had a right hemiplegia and aphasia. In one patient with acute right hemiplegia (No. 19) the temperature of the right cheek only was much lower than the left a short time before death. In longer standing hemi-



B. H., single woman, 52, librarian. Much dominated by mother and employer, given to intense emotional outbursts of anger and resentment followed by remorse which were more frequent in recent years. *Psychoneurotic.* Physical and laboratory examinations negative. Record (continuous) made with photoelectric temperature recorder (G. E.) from right cheek. Room, 70°. Mouth, 98.3°. Rectal, —.

A—B resting quietly.
B—C thinking about unpleasant aspects of life history (twitches of arms and legs).
C—D resting quietly—not preoccupied.
D—E thinking about an experience that angered. (Red face.)
E—F thinking about an amusing experience. (Smiles.)

plegia, right or left, with or without aphasia, affecting the upper and lower extremity unequally, the two sides were much alike in temperature. What they might do during controlled cooling or warming is difficult to say, and what variations may occur from time to time in the temperature of the various loci, is not well known. By the electrothermogram, to be mentioned later, one hemiplegic gave temperature readings for both sides much the same and with

seemingly little variation, under conditions of rest, and under emotional stress. The emotional responses to the two sides in one hemiplegic (No. 13) were much the same. Pilomotor responses were not especially noted in this patient. Evidence for unilateral hyper- or hypothermic responses is less than certain literature on hemiplegia would lead one to believe. However, the variety of environmental temperature conditions by which differences in the two sides might be elicited affords much opportunity for work, even suggesting the possibility of predicting on which side certain types of intracranial vascular accidents may occur.

In the case of B. H., the reduction in temperature of the right cheek following preoccupation with an unhappy aspect of life is very unmistakably 3 to 5½° F. as demonstrated by the electrothermogram. Subsequent changes as a result of less unpleasant preoccupations were not so effective but, in general, were associated with a slight rise in the temperature of the right cheek. The duration of surface temperature changes is a subject worthy of much more study, but it seems more than transitory in some patients.

From these observations one is led to believe that surface temperature is a fluctuating condition with patterns perhaps peculiar to individuals. Some persons may react emotionally without much change in surface temperature, but it seems likely that such would not be usual if one could follow a patient for a time. The face, in many of the subjects, appears to be a zone of maximum fluctuation which may account for the blush of emotion so commonly associated with this bodily area. Blushing, or its equivalent, doubtless occurs in other parts of the body. A reaction quite the opposite extreme of blushing also seems to take place. The responses to emotional states may be an elevation or a reduction of surface temperature, and all parts of the body do not behave the same.

The ephemeral surge of surface temperate in man is a reflection of the reciprocal impact between the individual and his environments. To the physiologist, the conditions altering oxygen consumption, fluid intake, sleep, blood flow, muscle tone, and reproductive urges, seem almost indistinguishable from some of those subjective and objective changes called emotions and affects by clinicians. Surface temperature fluctuations doubtless have much telltale significance in revealing our defenses from and hostility to a variety of conditions—including infections—that are foreign to

us. Approached from one standpoint, this avenue of energy dissipation demonstrates homeostatic principles; viewed from another, it represents various grades of personality adaptation all the way from good health to psychoses, or ergasias.

SUMMARY.

(1) A brief review of the literature is presented, including the history of factors affecting body temperature.

(2) The heat regulatory capacity of children and schizophrenics is discussed.

(3) Some surface temperature readings of twenty patients are presented. The most outstanding effects of emotional influence on surface temperature occurred in a schizophrenic, and in two psychoneurotics, one of which showed the major hysterical reaction. Weeping caused a noticeable change in the surface temperature of one patient. The temperature of the two sides in hemiplegics was remarkably similar. The electrothermograph of one patient, preoccupied by unpleasant aspects of her life-history, shows a sharp drop in the temperature of the right cheek.

(4) Emotional reactions appear to have an inconstant effect on surface temperature, as Pembrey had concluded. It seems fairly well established that emotions or affects may conspire to produce surface temperature deviations, variable in duration, even to the extent of fever, or outspoken hypothermia.

(5) The face appears to be the zone of most marked temperature fluctuation which may account for the frequency of blushing in this region. Reactions quite the opposite of blushing may occur.

(6) The centers in the brain having some effect on heat control seem to be in the hypothalamus. Localization of cortical representation (if there be one) for the peripheral sympathetic nervous system has not been adequately demonstrated.

(7) Emotional, or affective, life as seen by the clinician is a relatively crude objective and subjective chain of events. To the physiologist, surface temperature variation is only one of many reactions of the individual to the external and internal environment.

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DISCUSSION.

DR. LAWRENCE SELLING (Portland, Ore.): I am much interested in this paper and grateful for the privilege of discussing it.

It is always true in medicine, as Dr. Ziegler has said, that the development of precision methods of any sort gives us pause and gives us an opporunity to revaluate our old concepts in the light of these new methods, and we know that many times in the history of medicine tremendous advances have accompanied work of this sort.

We know, of course, that these methods of surface temperature measurements have already given valuable results in other fields of medicine. You are familiar, of course, with the work in the field of peripheral vascular disease in which these studies have been extremely valuable in determining what part of the peripheral vascular disease is due to spasm and what part is due to vascular occlusive phenomena, and giving help in determining whether cases of this sort should be surgically approached or not.

It was reasonable, therefore, to approach this other field in the light of this new work, and to see whether under the influence of the emotions new facts could be developed by the determination of surface temperatures.

We knew, of course, that such things did exist. We have known for many generations that under the influence of the emotions of embarrassment there was a flushing of the face which meant a vascular dilatation, which obviously means a rise in surface temperature, and by the same token an individual who is terribly frightened becomes pale, which means a peripheral vasoconstriction, and with that a drop in surface temperature.

It is interesting to note, as Dr. Ziegler has pointed out, that the most striking charges occur in the face. Unfortunately, the value of this particular method is doubtful; there are too many factors coming into play, for instance, the factor of temperature dissipation and the central regulatory mechanism in the hypothalamus. Things can go wrong in these ways, making conclusions very difficult.

It was disappointing, I am sure, to Dr. Ziegler to find that by the use of these new methods no fundamentally new facts were developed. However, that does not mean that a piece of work of this sort is unimportant; on the contrary, this is an opportunity to do further work to determine different states, and with further investigation of methods superstructures of permanent value can be built.

I was much surprised to note the effects in the cases of the hemiplegias. One would think there would be more variations than were shown in the charts. We are so familiar with the cyanosis and the cooling that occurs in a hemiplegic extremity that I thought the changes in those cases would be more marked than they were.

One group of patients was not considered here; that is, no charts were shown. It seems to me this group might show more marked changes than any other, that is, the group of anxiety tension states. In no other group of patients do we have such marked sympathetic or, at least, vegetative imbalance, with the palpitation, the sweating, the tremors and the pallor.

That group might serve, it seems to me, to show changes under emotional stress that would be more marked and more striking than those shown by the patients whom Dr. Ziegler selected, and undoubtedly he will take the opportunity of following out this work in patients in whom this imbalance is much more striking than in, for instance, the schizophrenics and depressives.

I was tremendously interested in going over this material, and, as I said before, it serves as a starting point for further work on which a definite superstructure can be built.

DR. ARNOLD W. HACKFIELD (Seattle, Wash.).—I was glad to have this opportunity of listening to Dr. Ziegler's paper, because I had already talked about it yesterday. I have been reviewing the literature on the subject recently because I have been interested from a clinical standpoint.

This type of work, I think, adds another chapter to psychosomatic relations. Dr. Ziegler and Dr. Levine some years ago showed the clinicians that emotions can produce very marked changes in the basal metabolism, and that those cases are not necessarily true hypothyroid cases.

We today know through modern psychiatry that high, metabolic reactions are very common in certain types of emotional states. This, from a clinical standpoint, I think is very important. As Reimann, of Philadelphia, points out, many of these patients not only with acute hypothermia but with a chronic hypothermia running over a period of years, 16 and even 20 years, are frequently unnecessarily sent to the tuberculosis sanatorium thinking they have tuberculosis.

That has actually been done and reported in the literature, so that this kind of work showing that emotions do produce temperature changes is very important.

I have had the opportunity to study two cases of this kind, both from a psychopathological standpoint as well as a clinical standpoint. One interesting phenomenon that I was struck by this afternoon in the cases Dr. Ziegler has presented to us, is that the groups with the temperature rise present were the depressives, the major hysterias and the so-called catatonic group.

Dr. Hoch in his monograph on benign stupors pointed out that those cases had a preponderance to the development of idiopathic hypothermia. Dr. Henry pointed out the same fact. In other words, these rises in temperature occur in the emotional states where there is, apparently, a lack of expression in the neuro-muscular level. In other words, there is no out-flowing of energy taking place. They are retarded in speech and motor activity.

As Dr. Ziegler has pointed out, most of our temperature production takes place through a process of oxidation in the cells, and in these people where

there is no dissipation of the energy produced in the cells, but there is the psychological will to express oneself in relation to the environment, this temperature rise is the way to get rid of this energy.

In most of these patients I have studied quite intensively I find this characteristic—the inability to choose between two ideas and arrive at a definite conclusion and execute. And whenever a blocking takes place, you get a rise in temperature.

Dr. Larson presented some interesting cases this morning with which I am familiar because of the proximity of Seattle to the Western State Hospital. Whenever you take these cases, the acute delirious manias, of whatever you wish to call them, and put them in physical restraint, cut out their muscular dissipation, the temperature goes very high. I made that unfortunate mistake in one of my private cases in private practice. I put him in restraint and his temperature went very high. Then, in addition to that, he developed an acute paroxysmal tachycardia, and his pulse rate was 180 plus. He developed an acute dilatation of the heart.

We broke that with quinine-sulphate, and the temperature went up again. Then a couple of days later he developed an acute paroxysmal tachycardia. We broke that again, and he developed an acute gastric hemorrhage. After that cleared up, the man stayed normal and he is well now.

The analysis showed definitely this blocking and his inability to express himself.

I would like to have Dr. Ziegler's reaction on what he thinks about that.

Dr. Lloyd H. Ziegler (closing).—It would be interesting as well as puzzling to theorize on what might happen if flushing happened in the diencephalon itself in the hypothalamic area, and I am not sure but that it does. I think we are all confronted these days with the problem of what happens to the schizophrenic group when we give them insulin. The temperature drops to a low level in spite of the fact that they perspire freely. The exact nature and cause of this, I suppose, we have not studied, but this phenomenon I should call to your attention as being among those which bear in this field.

THE SEEMING AGGRAVATION OF DRUG DELIRIUM AFTER WITHDRAWAL OF THE DRUG, AND ITS BEARING ON THE QUESTION OF THE HARMFULNESS OF WITHDRAWAL.

By MAX LEVIN, M. D.,

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Physicians who see many cases of drug delirium (in which I also include alcoholic delirium) will recall instances in which the discontinuance of the drug was followed by an apparent aggravation of the patient's behavior. For example, a patient is admitted to the hospital in a bromide delirium, and the drug is stopped; and whereas on admission, though delirious, he was quiet and made no disturbance, two or three days later he becomes boisterous and unmanageable, continuing so for several days. This seeming aggravation is not only of theoretical but also of practical importance, since it has led to the belief that the withdrawal of delirium-producing substances is sometimes dangerous. In this paper I shall try to show that such cases by no means justify this belief, but are open to an utterly different explanation. I shall compare them with post-epileptic furor, and shall show that they and furor are explained by a common principle.

Post-epileptic furor will be considered first, since its causes are well understood, thanks to the insight of Hughlings Jackson. The wisdom of his views will, I believe, become even more evident when the problem of furor is considered side by side with that of the seeming aggravation of delirium.

In order to understand Jackson's explanation of post-epileptic furor, one must bear in mind his views on the constitution of the nervous system. Jackson held that the nervous system is made up of a series of levels, ranging from the simplest spinal pathways to the most complex pathways of the highest cerebral centers. There are several differences between lower and higher centers. One is that lower centers are more automatic, while higher centers are less automatic. The difference that will chiefly concern us here is in the degree of organization of nervous centers: the lower a center, the

more highly organized it is. This matter may be given further consideration, since Jackson's concept of "organized" is exactly opposite to that of many authors. It is commonly said that higher centers are *more* organized than lower; the highest centers are said to be "highly organized" while the lowest are "unorganized." Jackson's use of the word organized is exactly the reverse of this. He spoke of the *lowest* centers as the *most* organized, and of the *highest* as the *least*.[1] The most organized center is that whose component parts are most stable, most resistant to destruction. It is that which functions most stably under the widest variety of conditions. On this view, the most organized centers are the lowest. Thus the centers for circulation and respiration are so firmly organized that they function day and night unceasingly until death. By contrast, the highest cerebral centers are so delicately organized that their functioning is impaired with notorious ease: a few drinks, for example, will blunt one's critical faculties, and a few more may virtually abolish them.

To say, then, that a nervous center is highly organized is to say that it is highly stable; its parts are durable and are joined fast, hence it is highly resistant to paralyzing agents. In the face of a circulating poison, it stubbornly resists and, compared with other centers, is among the last to succumb; and when it and other centers have succumbed and when the poison is cleared out, it is among the first to recover.

In analyzing such symptoms as post-epileptic furor, Jackson made a distinction between negative and positive phenomena. Negative phenomena, such as coma, are due to paralysis of nervous pathways. Positive phenomena, on the other hand, such as furor, cannot result (at least not directly) from paralysis of pathways, since a something cannot arise from a nothing. They can result only from the action of healthy pathways; more specifically, from the action of healthy lower pathways which, owing to paralysis of higher inhibitory pathways, have got out of control. When, therefore, a patient emerges from post-epileptic coma and enters a state of furor, the physiological sequence of events is as follows. During the fit there is excitation of all levels of the nervous system. At the end

[1] Selected Writings of John Hughlings Jackson. London: Hodder & Stoughton, Vol. II, pp. 395 and 437, 1932.

of the fit there is profound exhaustion of the nervous system, manifesting itself in post-epileptic coma. This exhaustion involves almost all nervous centers (all but the very lowest). In due time the exhausted centers recover their function, *but they do not all recover at the same time:* the lowest centers among them, being the most strongly organized, recover first, so that there is a stage at which certain lower centers are active—indeed overactive—while the highest centers are still exhausted and therefore incapable of controlling the lower.

Post-epileptic furor is thus a sign that the nervous system is recovering from its exhaustion. It is, *physiologically,* a good rather than a bad sign. I emphasize physiologically, because there is a difference between the physiological and what we may call the social viewpoint. From the social viewpoint a patient, in passing from coma to furor, grows worse, not better. In the eyes of a policeman a man in furor is worse than a man in coma, since he is a greater menace to others.

Turning now to delirium, I submit that the transition from low muttering delirium to delirious excitement is, in principle, the same as that from post-epileptic coma to furor. Suppose a man has a very severe bromide delirium. Besides disorientation, he shows deep prostration; far from being excited and noisy, he lies quietly in bed and scarcely has the strength to raise his voice. His condition is but a few steps removed from coma, a very large part of his brain having been paralyzed by the bromide. When the drug is stopped, the paralyzed centers begin to recover. Of the centers that have been paralyzed, the lowest (the most strongly organized) will be the first to recover; the highest (the least strongly organized) will be the last. Consequently there will be a stage at which the highest centers are still *hors de combat* while lower centers, now healthy and uncontrolled, are in vigorous action. The highest centers being still paralyzed, the patient is still delirious, *i. e.,* he is still confused and disoriented. But, the lower centers being now in vigorous action, he is no longer prostrated but is overactive and boisterous. Here, as in post-epileptic furor, one must avoid the mistake of confusing physiological and social issues. To the ward nurse the patient, in passing from drug stupor to excitement, has grown worse, since he has changed from an unobtrusive man to a disturber of the

peace. But physiologically he has grown better, since his excitement shows that some of the paralyzed centers have recovered from their paralysis.

It is therefore absurd to say that the sudden stoppage of the drug has caused the patient's condition to change for the worse. The change in his condition looks like an aggravation but is really an amelioration. It is a sign that his cerebral centers are recovering from the effects of the drug, that the lower centers have already been relieved, and that relief of the highest is in sight.

THE PROBLEM OF THE ALCOHOLIC IN THE COMMUNITY.*

Extra-Mural Study and Treatment.

By ROBERT V. SELIGER, M. D.,

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The purpose of this paper is to stimulate the development of organized interest in the alcoholic as an individual in the community. For many years, American psychiatry, with few exceptions, has looked upon the alcoholic with more or less hopelessness. This notion has become so deep-rooted in most sections, that one finds the individuality of the patient unjustifiably lost in the condemnatory fatalistic "hands off" attitude of some of our colleagues. I do not wish to imply that there is hope for all alcoholics, for one must concede that many are past correction. However, a carefully selected number can be guided and helped to attain the goal of all therapy (total abstinence) by an objective, dispassionate and individual approach. In 1900 A. Forel [1] reported the following:

> About 1882 or 1883 I had treated in vain a confirmed dipsomaniac who was admitted to the hospital four times. He always began to drink again, struck his wife, threatened murder, etc. I pronounced him incurable and recommended divorce and detention. At the advice of a minister, the wife made an attempt to take him to a small asylum for inebriates of a temperance society at Basel, then unknown to me. There he remained six months, became a total abstainer and agent of the society in Paris. From that city I received a sarcastic letter from a relative of mine about a year later; the patient sent his regards and thanks for the treatment, since he had been cured in Basel and he has indeed remained cured since, *i. e.*, for 15 years. This made a deep impression on me. Here I was paid and employed by the state to cure my patients and failed to do it, while medically untrained people succeeded. In this case we did not deal with one of those numerous cases of spontaneous cure of a mental or nervous disease which the ignorant ascribe to their quackery. It was an undoubted effect of treatment. I took the lesson with a good grace and congratulated the cured patient. The old remorse cut deeper than ever. I tried to get some information but did not find any.

* Read at the ninety-fourth annual meeting of The American Psychiatric Association, San Francisco, Calif., June 6-10, 1938.

All my efforts to turn my alcoholics into permanent water drinkers were in vain. Fully 25 per cent of the male admissions to my hospital were alcoholics. Later their number rose above 30 per cent.

About 1884, I happened to send for a shoemaker in the neighborhood, a Mr. J. Bosshardt, to take my measure for shoes. After this had been done I offered him a glass of wine as is customary with us. He declined with a smile. I was surprised and asked him if he was a temperance man. "Yes, sir." "Total abstainer?" "Yes." "You have a society, perhaps?" "Yes, a small one in our part of Neumunster; I happen to be its chairman." Then I jumped to my feet. "You are the man for whom I have been looking. Will you receive into your society the alcoholics who leave the hospital? I should send you the most promising cases with profound gratitude." "With pleasure; send me all; one never knows whether the apparently worst ones do not turn out the best after all."

We rapidly came to an agreement. From that day every alcoholic who was improving was sent with an attendant to the shoemaker and to the meeting of the society. With a touching self-sacrifice and with the greatest insight the poor man devoted himself to the patients. His recompense was their recovery. And as if by a charm, for the first time in my life, I saw drunkards recover, truly and lastingly cured. To be sure, there remained many relapses, since only the worst ones came to the hospital for the insane; and the poor shoemaker suffered many a disappointment which pained him very much. Yet his angelic patience could not be discouraged. This lasted one year and a half longer. I myself felt worse and worse over it. The medical part I played in the arrangement appeared more and more pitiable. One day I said to Mr. Bosshardt: "Well, dear friend, it is nearly two years now that you have devoted yourself in such a disinterested way to my alcoholics, and that many get well is something I never saw before. Please explain to me how it is. I am paid by the state to cure these people, and I cannot do it. You are the one who cures the drinkers, not I. Why can I not do it? I am deeply ashamed." He answered briefly with a smile: "It is very simple, Director; I am an abstainer and you are not. That is the secret. You cannot teach others convincingly that which you do not do yourself." "You are more than right," I answered; and I put an end to my wine-drinking.

From that day (1886) I became an abstainer. It is true, I was afraid it might hurt my health, so deep were the roots of the prejudice in my head. I had made a former trial of abstinence which was too short and it succeeded half-way only; but I could not stand such a humiliating condition any longer, which formed such a contrast with my obvious duty. On the same day my wife and myself became abstainers. I thought then that she made a great sacrifice, whereas she did not care at all for alcoholic drinks.

From that day, and as if freed from an evil charm, I could depend on my own sails and did not need anybody to assist me to cure alcoholics. One must have gone through such a change to fully appreciate the power of example and of the force of one's own consistence in action. Hundreds are

the numbers of drinkers and drinkers' families which I have cured since then and led from the deepest misery to the happy and useful existence.

Through this work I had at least 20 times as many positive results of cure as in all the rest of my 24 years of psychiatric activity. This fact cannot be shaken.

The terms "chronic alcoholic" and "alcoholic" as used here include only the pathological drinker and definitely exclude the social drinker. The social drinker can "handle" his or her alcohol while the other is "handled" by alcohol, *i. e.,* social drinking *per se* does not interfere with an individual's important life activities in business, in the home, in the family and in the community. Problem drinkers, uncontrolled drinkers, dipsomaniacs and spree drinkers are all viewed as pathological drinkers. Diethelm [2] states "A patient should be considered a chronic alcoholic when he harms himself or his family through the use of alcohol and cannot be made to realize it or when he no longer has the will or strength to overcome his habit."

The handling of the alcoholic should always be based on the study of each individual as presenting a separate problem. All patients should not be treated alike as one usually finds in many of the mass treatment "alcohol drink cures." Before therapy is decided upon, a complete investigation of the patient is made by obtaining all the available facts through a biographical history from birth to the present, including his place in the family, developmental data, presence or absence of disturbing behavior in childhood, adjustment in school, vocation and marriage, sexual life and its complications, religious habits and feeling, financial status, family situations and his emotional attitudes to them. The formal mental status studies the general behavior, stream of activity, mood, special preoccupations, sensorium and intellectual resources and insight. A physical and especially a neurological examination is made to determine the presence of any organic pathology. A partial or more detailed personality study, summing up the patient's assets and liabilities is then prepared. The family and other relatives are interviewed for additional helpful information. The material thus obtained and studied is then used as an aid in determining why this particular alcoholic drinks and to what treatment approach the patient belongs.

What aids are used to fit the treatment to the individual? A very important one is the presence or absence of a definite desire to abstain. If this desire is present, is the patient honest, sincere, and genuine about it? What are his alcoholic contacts in business and

social life? If the patient is associated with the alcohol industry one should not attempt to help and guide him at home but the patient should be placed in a rest home farm. The make-up of the individual is, of course, very important in deciding the course to follow. He should have average or better intelligence; but a high degree of intellectual endowment alone is not enough, for there must be some degree of maturity in his emotional make-up. The apparent reason for drinking also aids one in selecting the patient. After studying many patients one finds one or more of the following *apparent reasons:*

(1) As an escape from situations of life which he cannot face.

(2) As evidence of a maladjusted personality (including sexual maladjustments).

(3) As a development from social drinking to pathological drinking.

(4) As a symptom of a major abnormal mental state, such as a depressive or schizophrenic reaction, etc.

(5) As an escape from incurable physical pain.

(6) As a symptom of a constitutional inferior—a psychopathic personality, *i. e.,* an individual who drinks because he likes alcohol, knows he cannot handle it, but does not care.

Many times one cannot determine any great and glaring mechanisms as the basis of why the drinker drinks; but the outstanding fact may be elicited that alcohol is taken to relieve a certain vague restlessness in the individual incident to friction between his biological and emotional make-up and the ordinary strains of life.

The psychiatrist then determines to which of the following the individual belongs:

(1) The individual who desires to abstain but who is unable to do so by himself. This patient has the desire to abstain and his life habits and contacts are not too bad; he has good intelligence and some maturity in his make-up. This patient is to be handled in outside office practice type of psychotherapy.

(2) The individual who desires to abstain but is unable to do so by himself, who has poor habits and contacts, good intelligence and some maturity in his make-up. This patient should be placed in a rest home farm where psychotherapy including help and guidance away from his contacts is started.

(3) The individual with good intelligence with rather immature make-up who should abstain but does not desire to do so. Most of this group have poor habits and contacts although some do not. This patient should be placed on an alcohol farm, sanitarium, or hospital under the Inebriate Act, for a definite length of time.

(4) Korsakow's psychosis and alcoholic deteriorated patients are treated in mental hospitals permanently.

(5) Individuals with delirium tremens should be placed in acute psychopathic hospitals and then studied in the above way for future handling.

(6) Feebleminded individuals with history of repeated commitment to the work house or house of correction, after careful examination should be handled by the penal system.

Extra-Mural Treatment.

Treatment should begin with the immediate withdrawal of alcohol. The patient should be instantly informed that the goal is total abstinence and all concerned must recognize that an individual who has been a pathological drinker can never be a social drinker. A person who has once been an excessive drinker can never be a moderate, controlled, or a one-or-two cocktail drinker. He must understand that there is a sacrifice of both time and money involved in the treatment and that the road to the goal is a long and hard one, requiring patience, determination and absolute honesty of relationship between patient and physician. He is given to understand that failures in the past under other types of treatment mean nothing and are not obstacles to his attaining the goal, and that "once an alcoholic, always an alcoholic" is a general misstatement. For months, in some patients, the only headway made is the teaching of the fact that he can live without alcohol and this realization plays a great part in his re-education.

The patient reports to the psychiatrist's office at regular intervals, at first daily or three times a week and then less frequently.

He must be punctual, in spite of inclement weather, "previous engagements" or any other issues used so often for cancellations and postponements. Coming is *his* job!

Should he feel after a few weeks of abstinence that he can go along on his own and stop coming for his interviews, the physician

will not call him or otherwise remind him of his negligence. The responsibility is *his*.

He must never test himself out to determine whether or not he has the problem "beat" by taking one drink. All drinking must be stopped instantly, without any tapering off.

When a large alcohol intake is abruptly stopped, sedatives are often necessary for a while to relieve the "shakes" and any jittery feeling which may follow the withdrawal. With this the sugar intake is definitely increased and the patient is also advised to take heavy doses of vitamin B in the form of brewer's yeast.

Psychotherapy is continued throughout interviews. Other methods of handling the need for escape from situations are considered. Very frequently it is possible to modify poor vocational adjustment, or irritating marital situations involving sexual incompatibilities, unwholesome living conditions with in-laws in the family life, parental conflict over the management of children, etc. The patient himself may not be conscious of the strains that all these things are upon him. When it is not possible to modify the situation, it is often possible to change the patient's attitude toward the difficulties he has to meet. Many a person becomes morbidly self-accusatory and fatalistic because of what he considers his failure to modify the unmodifiable. Such an individual may be greatly helped by mutual discussions, constructive criticism and wise guidance.

The interviews are further used to outline a recreational program and develop interest in new hobbies, diversions, club activities, etc. It is wise to have the patient at the beginning of the treatment give up his drinking friends and meeting places and replace them by non-drinking contacts. Later on he is allowed to visit friends and go to dinners where cocktails are served.

During all this time stress is laid upon the point that total abstinence is the only possible road to, and goal of, therapy.

The mate of the patient is interviewed many times, for the attitude toward drinking of wife or husband is extremely important. Their tact and diplomacy in handling past and present situations and episodes together with their intelligent cooperation in the planning of new activities are major therapeutic aids. One cannot stress too much the significance of the mate's attitude and cooperation. Many a poor result of treatment is due to the absence of any insight whatever in wife or husband.

During the early months of treatment the patient uses as a splint the physician rather than the alcohol which he has previously utilized. Throughout the treatment there is established a close personal relationship between the patient and the doctor. In this way the latter develops a definite knowledge of how the patient "ticks" and the patient derives confidence and helpfulness in realizing the physician's understanding of his own particular problems.

The patient who comes with an honest desire for help should be approached with sympathy and kindness that eliminates ideas of punishment, fears of failure and attitudes of inferiority. Patient and physician should meet each other halfway with frankness and mutual expectation of confidence. The psychiatrist's tact and diplomacy in presenting to the patient the liabilities of his make-up is extremely important.

Personality of the Psychiatrist.

After reviewing the literature on cures, treatments, rehabilitations, help and guidance for the alcoholic, one feels definitely that the most important part of any approach which achieves successful results is the personality of the psychiatrist.

It is well known that good results have been obtained (besides patients abstaining by themselves, religious conversion and temperance pledges) through various types of psychiatric treatment approaches, such as the distributive analysis and synthesis of the psychobiological approach; through psychoanalysis, and its various modifications; through the approach of individual psychology, analytical psychology, persuasion and re-education.

Diethelm [8] states "A physician who is a total abstainer will achieve better results than a physician who has one attitude for himself and another for his patients. The totally abstaining physician carries much more conviction in his advice and exerts a strong suggestive influence." Besides being an abstainer the psychiatrist should be sympathetic, kind, keep his promises, have no outward aggressiveness and although approving many of the patient's minor complaints and irritations, should always be the boss of all situations. The doctor should be of the tolerant type, plastic, able to take it and have a great deal of flexibility in his make-up.

Alcohol Sensitivity.

Raymond Pearl [4] says: "Whether any particular person chooses to be a teetotaler, a moderate drinker, or a sot is a matter to be decided between himself, his inherited constitution and his religion. The only pertinent advice I can give him is that he learn, by precise experimentation, what constitutes moderate drinking for him. Nothing emerges more plainly from all the scientific work that has been done on alcohol, than that individual tolerance to alcohol is a highly variable phenomenon." Peabody [5] is quoted as stressing the fact, "that there are some individuals who cannot with safety drink alcoholic beverages at all. In such persons there is practically an allergic susceptibility which acts on the mind and paralyzes restraint and control. They should avoid its use just as those who have an idiosyncrasy to quinine should not use that drug." Dr. Adolf Meyer [6] states, "As pathological intoxication in a limited sense, one recognizes reactions or susceptibilities of certain individuals who are as a rule 'alcohol-sensitive,' easily affected by even relatively small amounts."

Many of my patients between the ages of 30 and 50 gave a history of being pathological drinkers for from five to six years although they had been drinking from 15 to 20 years. They gave, at the time of their interview with me, a definite history of not being able to stop after taking one drink, in other words, one drink would start a so-called alcoholic bout. After a time it occurred to me that perhaps rather than having their resistance lowered to alcohol, these people developed a distinct sensitivity to alcohol; not a physical but a "psychobiological sensitivity," an acquired sensitivity to alcohol. This "psychobiological allergy" is explained to the patient with the help of a comparison. Using the allergy in asthma as an example of physical allergy, he is told that due to his sensitivity the asthmatic keeps away from ragweed, and in the same way the alcoholic patient should keep away from alcohol. The asthmatic when emotionally upset does not run into a field of ragweed and brush the ragweed past his nose, and similarly the alcoholic should not under stress of emotion run for the whiskey bottle. It is, further, my feeling that many individuals have a congenital, often inherited psychobiological sensitivity to alcohol and as a result, in early years of life, may become pathological drinkers. In a previous paper,[7] "Understanding the Drinker," I stated that during interviews with my patients a

discussion of the fatalistic theory that "My father and brother are alcoholic, therefore I have to be an alcoholic," was not a fact but was used many times as an excuse for continued drinking. I definitely, however, feel that those people have a real psychobiological sensitivity to alcohol of the congenital type which should be recognized early in their lives. This "psychobiological sensitivity" explanation of the inability to handle alcohol (in the abstinence desiring, good intelligence, fair maturity type of patient) is a distinct aid to therapy, for the following reasons: first, the patient feels that he can definitely see an illness (comparison with the physical asthmatic sensitive); second, he feels that he now has an *understandable reason* why Jack and Harry can handle alcohol and why he cannot; third, the licked feeling of not being a man—a moral defeat—is taken away from him.

Case Reports.

The following case summaries which have been discussed in a previous [8] paper are presented to illustrate the extra-mural type of treatment.

Case 1.—A 27-year-old white married woman was examined on March 3, 1935, at the request of her family physician and husband for consideration of commitment to a state mental hospital. The complaint made by them at the time was that she was addicted to alcohol and two days before at the end of a five-day alcoholic bout, was found in a New York hotel by her husband who brought her back to Baltimore. There was a history of many severe alcoholic bouts for two years before the time of my examination; pathological drinking had been present for seven years. Incidents of running away and being found in a hotel under the heavy influence of alcohol had occurred in 1931 and 1932.

The patient, first of three children of a fairly wealthy family, had been spoiled and pampered from early childhood until her mother died when she was 13 years old. The next child of the family was born three years after the patient and is a male psychopath who has been married three times up to the time of this writing. The third child is six years younger than the patient and is a mental defective living now at a private sanitarium. The father, who (now aged 66) had been more or less of a social drinker until 1922 (although there had been pathological episodes before that time), is now a chronic alcoholic. The mother who was a total abstainer died at the age of 42. It is said that the maternal grandmother was a pathological drinker.

The patient who developed as a child within the usual limits, was a bed-wetter and nail-biter. She went to the usual private schools of her group but did not finish high school; she attended a business school for a short period.

One year after the mother died, her father remarried, causing the patient a great deal of unhappiness as she was not pleased with the situation. She snubbed the step-mother whom she describes as a bigoted, dull, uninteresting, stubborn individual. The patient carried this resentment to the step-mother until the time of her death about one year ago.

At the age of 20 the patient married a man four years her senior, an engineer whom she had known for six months before the marriage. The marriage lasted for two years and terminated when they moved to the home of the patient's father. The patient said that moving home was due to the illness (arthritis) of her husband. She stated that the cause of the separation and divorce was due to increasing personality incompatability, although before this developed, sexual adjustment was good.

Following this, for two and one-half years, the patient went around with another man from whom she broke away because of his jealous attitude. She then married a lawyer nine years her senior whom she had known for about three years but with whom she did not go steadily until six months before the marriage, when there was increasing friction at home with the step-mother.

The history revealed that the patient had been drinking for about 10 years, during the first three of which there was social drinking and during the last seven pathological drinking with increasing severity, terminating in the bouts which followed her second marriage.

The personality of the patient was described as that of a restless individual, fond of company and at times sulky, easily resentful; she was considered likeable and neat in appearance, wore clothes well and was bored easily. The patient spoke of herself as bashful, self-conscious, not plastic, aggressive and at times "liking to be alone."

She was essentially healthy physically. The neurological examination revealed slight tremor of the tongue and fingers and hyper-active reflexes.

Formal mental tests showed no abnormalities. The mental age by the Binet-Simon Intelligence Test was about normal. Insight was satisfactory. The patient stated that she needed help and wanted it.

In the three years that have elapsed since the beginning of treatment, the patient has not had one break and goes out everywhere, even to nightclubs and cocktail parties. The environment has not been too good and there have been many strains, financial and otherwise, present both large and small. She has abstained for over three years and now reports to me about every two months.

The next case illustrates the type of patient which is most preferable for the ambulatory treatment.

CASE 2.—A 54-year-old white married man was referred to me in November, 1934. The family physician stated that this patient had been a chronic alcoholic and desired advice and treatment about his condition. The patient's complaint at the time of the examination was that he had increasing difficulty in handling his alcohol for the past five years. Drinking alcohol in any form during that period landed him after 10 days of imbibing either in

a general hospital or at home in care of a male attendant. He had been drinking for 23 years but until five years ago he had lost no time from business or any other activities because of drinking.

He was the second of six children in a family of moderate circumstances. He had gone through childhood without any unusual problems. No early disturbing behavior problems had been present. He graduated from high school and took up a business course after which he entered the business world. He got along very well and was soon recognized as a very competent bond man, being with one company for 11 years and with another company for 20 years. Before the depression of 1929 he had a very nice income, lived in one of the better suburbs of Baltimore and belonged to various clubs.

He married at the age of 37 and had one child. He lost his wife after 10 years of married life. A year later he was married a second time to a woman 15 years his junior. His child was at a girl's school and there was no great strain between the child and the step-mother. His business income had decreased a great deal but there was no financial strain, as the first wife had left a trust fund with income. Religious, social and sexual adjustments were very good.

Family history revealed that the father, who is dead, was a spree drinker, and the mother, who is living, was and is a total abstainer. Other siblings were all occasional social drinkers but not one was a pathological drinker.

The personality of the patient was described as that of a conscientious, aggressive, somewhat stubborn man who played a good game of golf besides being a good bridge player. He was fond of company and a general good mixer. The patient speaks of himself as being honest, sincere, aggressive, serious-minded and not very plastic.

Physically he was essentially healthy. The neurological examination revealed tremor of the tongue and fingers and hyper-active reflexes.

Formal mental tests showed no abnormalities. The Binet-Simon Intelligence Test gave him a mental age above the average. Insight was good with regard to his inability to handle alcohol, but during the examination there was some evidence of resentment due to his feeling of inability to take care of his own affairs. Since that time the patient has abstained and has continued all his previous social adjustments and contacts.

This patient definitely realizes that he is sensitive to alcohol. He now returns twice a year and states that he no longer finds alcohol a problem.

In both patients treatment was carried on entirely in office practice. They had a definite desire to abstain which I felt was honest, sincere and genuine. The intelligence in their make-up was average in the first and better than average in the second patient, while emotional maturity was present to some degree in the first and was marked in the second patient. In the woman I felt that one was dealing with an escape reaction in a maladjusted personality. Although many psychogenic strains were evident in the second patient's

history, it seemed to me that the alcohol problem was to a great extent that of a fairly heavy social drinker who had become a pathological drinker.

Psychotherapy, aiming at re-education, re-conditioning and final rehabilitation, with daily activity schedules and a recreational program, interest in new and old hobbies, diversions, club activities, etc., was given very actively at the start. Daily interviews, then three visits a week were kept up for ten months by the first patient and for five months by the second. The frequency of the visits was decreased until at present the first patient comes every two months and the second patient twice a year.

Results.

Of forty patients selected for extramural treatment, thirty have responded very encouragingly. Not one has been discharged. There is reason to expect that all the successfully treated patients will continue their contacts with the psychiatrist for life, making one or two visits to his office yearly.

Conclusions.

(1) The purpose of this paper is to stimulate the development of organized interest in the alcoholic as an individual.

(2) All alcoholics are not past correction.

(3) The handling of the alcoholic should always be based on the study of each individual as a separate problem.

(4) Total abstinence for life is the goal of all therapy.

(5) "Psychobiological Sensitivity" to alcohol is discussed as an approach for certain patients.

(6) Discussion of the personality of the psychiatrist necessary to obtain results.

(7) Results—30 of 40 patients selected responded to this extramural treatment.

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DISCUSSION.

DR. RALPH C. HAMILL (Chicago, Ill.).—This very commonsense attitude toward the alcohol problem makes a great appeal to me as I am seeing many alcoholics at the Psychopathic Hospital in Chicago.

It seems that nearly every psychopathological case now is somewhat affected by the alcohol situation, that many individuals who have any psychiatric difficulties are apt to get into the alcohol situations.

I was particularly pleased with the definiteness with which the essayist handled the attitude toward these people. I am sure that to have something definite laid down for them helps in many cases.

As for the attitude toward total abstinence, it seems that every one of us, after a bad night, is willing to be a total abstainer, but by the end of the week our youth may have returned and we forget all about it. So that to count on an attitude of this sort is extremely difficult. That changes tremendously, especially in the pathological drinker.

As far as allergy is concerned that is a good idea, but in my experience I have found that alcohol is a good excuse for letting the whole works go and doing as we all have said to ourselves when we were children, "When I grow up, I'm going to do *exactly* as I please."

A part of the alcoholic situation is being big and tough and doing exactly as one pleases, so that it seems as though the allergy is a nice idea to hand to the patient. It is a dangerous idea, however, for the physician to have if he is going to understand his patient.

That leads to the last point, namely, that the alcohol case, the alcholic in the community, is also the alcoholic in the medical community, and what the alcoholic means to the medical and psychiatric professions it seems is something which has not been sufficiently stressed.

When we get these pictures of psychotics under the influence of alcohol, we get them quickly; we get certain statements from men who have had their last drink 12 or 24 hours before; we get statements from them that we cannot get from them the next day, and by the end of the week they would rather bite their tongue out than make those very statements, statements that are, one might say, just plain crazy, and that they can give those things up as the alcohol cleans out seems to me to be the extraordinary part of it.

DR. NATHANIEL H. BRUSH (Santa Barbara, Calif.).—Dr. Seliger's paper dealt with the problem of the alcoholic in the community, and showed us how necessary it was to have a cross-section, a pattern, of the individual's personality make-up.

That set me to thinking about the value of a cross-section of the community in which the alcoholic lives. All of these patients that we are seeing now, the alcoholics, began probably by drinking during the years of prohibition. Now there is no Sunday closing hour, there is not a saloon on every corner, but there is a cocktail lounge or cocktail bar any place you want it.

I was driving up here from Santa Barbara the other day, and passed through a pretty good-sized town which shall be nameless. My wife called my attention to a sign on one of these dine-and-dance places which read, "Cocktail Hours, All Day." That is a pretty good indication of the community's alcoholism.

To go back a minute to the question of the community's alcoholism, I might say that I come from Santa Barbara where, as you know, there is a rather large retired group of men and women.

It is definitely harder to handle alcoholism in a community like that than it is in a small community, a small country town. In just the same way it would be harder to handle the problem in Newport or Palm Beach, or any place like that, because the spirit of the community is largely drinking.

I was rather impressed with Dr. Seliger's example of psycho-pathological allergy. For a long time I have been trying to get something to explain their illness to them. I have tried to put it on the grounds of an illness like typhoid. I have tried to explain it in the way of chemistry, of changes in the water content of their brain, changes in colloids.

But we have here an example of an allergy phenomenon; we have something which we can present to the patient, something which he can understand and something on which he can hang his hat.

Perhaps some of you this morning heard Harry Lutgens, the Director of Institutions in California, speak about overcrowding. That is one of the difficulties which we have to meet when we try to dispose of that group of alcoholics, the chronic, deteriorated, incurable alcholics.

I have had many of them committed by sympathetic judges under the California Habitual Intemperance Act, and back they bounce on the community in about a week, and they do not give the other alcoholics any assistance.

You try to take care of a patient and say, "Bill, if you don't watch out you may have to go to a hospital." Well, Bill has seen Harry come back from a hospital the other day, and all your work is lost.

The inability of state hospitals to handle alcoholics is a tremendous blow to the type of patient which Dr. Seliger speaks about, the man who has insight, the man who has good judgment, who is an intelligent fellow doing his best to get off the alcohol, but through situational reasons or economic reasons he cannot undertake the type of treatment of which Dr. Seliger has spoken.

An important point, is the physician-patient relationship. It is an old saying that you can catch more flies with honey than you can with vinegar, and if you treat your patient with tact, understanding and kindliness, and if they continue as they have been doing, you don't lose your temper or show irritability, and don't punish your patient as you would a child, for you would not punish a child for whooping cough,—with that attitude in mind, you get a long way with your alcoholics.

DR. WILLIAM W. YOUNG (Atlanta, Ga.).—It seems ironical that studies in intoxication should be placed on the day after the annual banquet, and I have been unable to ascertain whether Dr. Hall's motivations were conscious or unconscious. I have a little suspicion that they were consciously motivated.

I find little of new concepts in this particular presentation, and yet on the other hand I feel that there are some things which are distinctly beneficial. After all, if I am correct, the psychiatrist for years has taken the attitude that in a pateint where drinking is the presenting symptom, the probabilities of cure are small unless the individual himself recognizes a need for help and comes seeking it.

On the other hand, we have felt that alcohol is a symptom and that each individual case has to be treated on its own merits. But I find persons, and I am sure everyone does, where the most difficult factor injected into the treatment is the moralistic attitude of the family and the community, and it is difficult to rid these people of this attitude.

For this reason, the patient is a target of preaching and nagging, and as a result he tends to accumulate guilt from which he must run by drinking further, or else he accumulates resentment and he punishes the people against whom this resentment is aimed by drinking further, so that to me it has been a very essential thing that in some way we rid the patient of these, or explain to the individuals coming in contact with the patient that their attitude must be changed.

I have been unable to arrive at any proper approach in this regard, so that I think in the matter of desensitizing the attitudes of the individuals coming into contact with the patient, the concept of psycho-biological allergy is excellent. Personally, after having received a reprint of Dr. Seliger's original work I have been utilizing this and, I think, with considerable success.

The other factor which the paper presents and which I feel is very heartening is the extremely optimistic attitude which it injects into the situation, for we in the past have been quite pessimistic about the possibilities or probabilities of cure for chronic alcoholism.

DR. F. E. WEATHERBY (El Paso, Texas).—Just one point was mentioned by the reader, a statement was made that individual tolerance for alcohol varies. That is our general impressionistic belief.

However, the modern police department do not agree with us. A drunken man is not a man who did certain things, he is a man who has a certain percentage of alcohol in his blood.

I do not attempt to answer that question, I merely raise it. If susceptibility does really vary, the chemical tests are not as reliable as we perhaps have been led to believe.

I would be glad to have the reader take up that point in his conclusion.

DR. HERBERT HARMS.—I do not know that I feel confident or competent to fill the shoes of Dr. Seliger, although I have worked with him in the clinic, or to answer the questions raised.

In answer to the question with reference to the police courts, I agree that that is probably correct, and I do not know that there is any solution at present for it. I don't know that we will ever have one.

I take this opportunity to thank the discussants for their feelings with reference to the fact that the problem of alcoholism was, and still is, regarded with a great deal of pessimism, particularly in state hospital work.

I happen to be in connection with one of the public hospitals in Maryland where that pessimistic attitude has prevailed, and one of our superintendents feels that the whole problem of alcoholism should be taken care of by the courts and penal system, and not by the hospital.

That, of course, is an extreme view, and I feel that with presentations such as Dr. Seliger's and with the discussants' cooperation with his viewpoints, certainly that attitude will change, and something will come out of it.

The last remark I would like to make with reference to my own impression of the paper was the fact that all of these patients reported back to Dr. Seliger at least twice a year, even after they had been in his care for several years. It seems to me that this is certainly an important point.

EXPERIENTIAL ASPECTS OF HUNTINGTON'S CHOREA.*

By ERNEST G. LION, M. D., AND EUGEN KAHN, M. D.,
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Much has been written on Huntington's chorea as an organic hereditary disease entity, but little consideration has been given to the question how patients, their relatives and their mates experience Huntington's disease.

As we propose to deal with some experiential aspects of Huntington's disease, our point of view may be clarified if we briefly re-emphasize some remarks made in a former paper (Kahn and Cohen).[1] Every person develops on constitutional grounds, but naturally under the continual exposure to, and under the influence of the outer world, a capacity to experience. From this capacity to experience develops what we call the *way of experiencing,* this is the *how* in which a person experiences. This way, this *how* of experiencing, is disclosed to us and, to a considerable degree, to the experiencing person himself, through his *experiential content,* that is, the *what* of his experiences. Let us illustrate our point with the psychopathological phenomenon delusion. Delusional, in our connection, is to be considered a way of experiencing. The single delusion however, for example, "I am George Washington," or, we had better say, the theme of the single delusion, is experiential content. It is obvious that we, the observers, become aware of this content primarily, and we draw conclusions from this content as to the underlying way of experiencing. The experiential content may be quite important; however, in some instances, it appears to be more or less incidental. The way of experiencing seems to have a definite relationship to the basic structure of the personality. Of the various aspects or components of the personality, the way of experiencing has, in our opinion, the closest affinity to temperament which, in turn, is tied

* Read at the ninety-fourth annual meeting of The American Psychiatric Association, San Francisco, Calif., June 6-10, 1938.

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up with the autonomic neuro-endocrine system and its centers in the diencephalon.

That the way of experiencing is thus based on biological grounds cannot be doubted. We deem it desirable and necessary, however, to steer clear of biological or physiological terminology whenever we deal with experiential aspects.

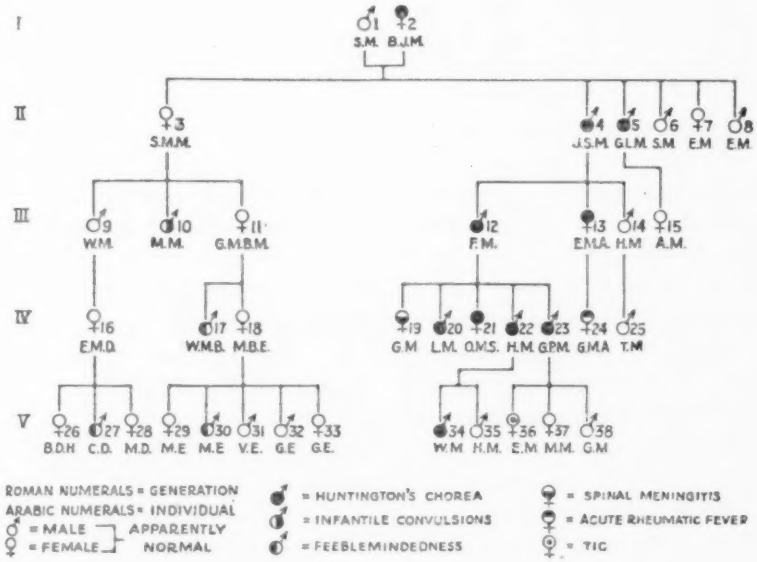
One can say that the single experience has a certain structure, namely, it begins with an *impression;* this is endowed with *reference* and *meaning;* and this, in turn, is followed by an *expression.* This structure, impression-reference-meaning-expression, we call the "experiential arc." It differs from the stimulus-reaction sequence in that it takes into account the experiencing individual in his entirety, personalizing the stimulus-reaction sequence.

As every person is changing evolutionally and involutionally, his way or ways of experiencing are undergoing changes, even if the outer and inner circumstances and conditions are "normal." Some of these experiential changes are transitory and minor; some are more or less persistent and of major importance. It is readily understandable that "abnormal" factors affecting the personality will contribute to the change in the way of experiencing. This, then, we would expect to be the case in a definite degenerative process, such as Huntington's chorea, in which some of the "organic" foundations of the personality are undermined. The organic change and the consequent change in the way of experiencing of such a patient, are bound to change subjectively his setting, to aggravate his situation, and, in ever so many respects definitely to limit or narrow his world. The patient's change cannot fail to bring about alterations in the attitude of the people in his environment, alterations which definitely contribute to the great change in the patient's total situation. Hence, if we are dealing with the experiential aspects of the disease, we are faced not only with a disease process, but with an individual who is ill with an organic hereditary disease, and who experiences himself in a predicament brought about by changes in himself, in the situation and in human relations.

With all these alterations there will be, from the very beginning, changes in the patient's experiential content. Such experiential contents are represented first by personality changes, and later by neurological alterations and by sensorial-intellectual defects as

the chronic progressive choreic condition advances. The choreatics, and to a certain extent their mates, their offspring and their relatives, experience the situational problems (contents) which are created by the illness, such as socio-economic incapacitation, advisability of marriage, danger of transmission and the possibility of developing the disease.

A study of the experiential aspects of these individuals was stimulated by the admission to our wards in 1936 of two brothers, H. M., IV-22, and G. P. M., IV-23 (chart) who were suffering



from Huntington's chorea. One of them died, and the autopsy confirmed the diagnosis.

They, their offspring, their ancestral line and their collaterals, were intensively investigated by interviews, by examinations, by field studies and by records of hospitals, physicians and social agencies. It was possible to trace the family through five generations.*

* We restrict ourselves to the reproduction of the family tree. The genealogical material we do not care to publish here as, in our opinion, it does not show anything new.

In the five generations there were 38 individuals studied. Of these, 10 suffered, or were suffering, from this uncommon hereditary condition. It may be that the head nodding tic in E. M., V-36, may represent an early stage of chorea possibly bringing the total up to 11.

Of the 10 choreatics, seven were men and three were women. The average age of onset was 25 with a range from 7 to 45. Although certain questionable cases of congenital chorea have been reported from time to time, an onset at the age of seven, which occurred in one of our patients, W. M., V-34, is unusually early. The average duration was 18 years with a range of 10 to 28 years. Forty-two was the average age of death, while the range was from 21 to 62 years of age.

RESULTS.

For the purpose of illustrating ways of experiencing, experiential contents of the choreatics, their mates, their offspring and their other relatives were arbitrarily subdivided into the following:

1. Personality changes brought on by Huntington's disease.
2. Neurological symptoms attributable to degenerative lesions.
3. Sensorial-intellectual defects due to organic lesions.
4. Socio-economic incapacitation caused by the malady.
5. Advisability of marriage and danger of transmission of the hereditary taint.
6. Possibility of developing hereditary chorea.
7. Neuropathic and psychopathic traits possibly related to the degenerative chorea.

Those experiential contents, of course, change in the individuals as the disease takes its course and certain socio-economic consequences develop. In their attitudes toward the alterations in experiential contents, however, the patients display definite changes in their ways of experiencing.

I. Personality Changes Due to Huntington's Disease.

Personality changes in our patients antedated the choreic movements. These early indications of the disease process were experienced in a variety of ways, but there were some similarities too. The changes induced by the disease process in the way of ex-

periencing, itself, subsequently became experiential content which was experienced in certain ways by the individuals.

G. P. M., IV-23, as personality changes set in, experienced events in an irritable way. This very change, an irritable way of experiencing situations, subsequently became experiential content to the individual. He became perplexed and annoyed at his own irritability; however, he was at a loss to put an end to it. Here we see that the impression component of the "experiential arc" has taken on an undue emphasis. A little later, jealous and suspicious ways of experiencing set in. G. P. M., IV-23, closely guarded his wife from other men, and he insisted that she wear heavy underwear and a number of petticoats to church. Here we see a distortion of the reference and meaning components of the "experiential arc" brought about by a change to jealous and suspicious ways of experiencing events. Hostility, aggressiveness, violence and even rage, later characterized the ways of experiencing of some of these individuals. F. M., III-12, and G. P. M., IV-23, were unkind to their wives. J. S. M., II-4, assaulted his spouse with a flat iron and his son with a club. G. L. M., II-5, became violent, throwing stones and clubs, and he went into paroxysms of rage which necessitated confinement in jail.

In a number of these patients the experiencing of psychosexual urges led to perverse and antisocial expressions. H. M., IV-22, no longer had sexual relations with his wife, but he began to masturbate. Fellatio requests were made by G. P. M., IV-23. The desire for sexual satisfaction was secured by three of them in exhibitionism. H. M., IV-22, exposed himself on a variety of occasions. G. P. M., IV-23, exposed himself whenever he wanted to get rid of company which he and his wife were having. Only W. M., V-34, however, masturbated in public.

As the disease process advanced some retreated, but others continued to struggle against these altered and altering ways of experiencing. G. L. M., II-5, sought his retreat in alcohol and became intemperate. On the other hand, H. M., IV-22, and G. P. M., IV-23, continued to struggle. They experienced their progressive disability and change to a sedentary life with great resentment. They maintained as many of their usual activities as possible, and gave up the remainder reluctantly. They were proud.

They denied the hereditary nature of their illness. They wished to maintain their independence so that charity was refused for a time. H. M., IV-22, threatened to commit suicide if he were hospitalized.

Mates of these afflicted individuals, likewise, to a certain extent were experiencing the personality changes and their consequences in their spouses. The first wife of G. P. M., IV-23, experienced these changes in her husband in a resentful manner. She wanted to retreat from the situation, so she obtained a divorce. However, later when the choreic movements became manifest, she was accused by other members of the family of having brought on his condition. She developed guilt feelings over having left him. In contrast, the second wife of G. P. M., IV-23, experienced her fate with resignation. She continued to live with him and to help him up to the time of his hospitalization.

II. Neurological Symptoms Attributable to Degenerative Lesions.

Organic drivenness has been discussed in a previous report (Kahn and Cohen),[2] but we wish here briefly to mention the characteristics of that syndrome, and to illustrate how they were experienced by our choreatics. By organic drivenness is meant the surplus of inner impulsion seen in brain-stem disturbances which manifests itself in a syndrome characterized by: (1) pronounced hyperkinesis with abnormal movements (choreiform, tic-like, myoclonic); (2) outstanding difficulty, almost approaching complete inability to maintain quiet postures; (3) clumsiness in the performance of movements; and (4) an explosive motor release of voluntarily inhibited activity.

The hyperkinesis with abnormal movements seems to be the primary symptom. This, we suppose, is caused by lesions in the brain-stem. Since these abnormal movements can be brought under voluntary control only for very short periods, an inability for quietude is bound to develop. Conflict of attempts at voluntary activity with involuntary movements handicaps the ease of the individual's performance leading to clumsiness. Whenever stowed impulsions abruptly break down voluntary inhibition of activity, explosive movements result.

Our choreatics experienced their hyperkinesis and abnormal movements in certain ways. Every one of them made efforts to do something about it. At first, before deterioration became noticeable, marked attempts at suppression occurred and anxiety was pronounced. At times they tried to incorporate their involuntary movements into commonly occurring gestures, or even attempted to conceal them behind a screen of such gestures. Sometimes voluntary movements were superposed upon abnormal movements with the pretension to make the latter ones appear purposeful. Inability to stop these involuntary activities and their irrepressible appearance and reappearance led to great irritability, resentment and frustration in G. P. M., IV-23. After some time, however, he became somewhat accustomed to these involuntary movements, more or less automatizing some of his attempts at suppression, superposition and concealment. He tried to get along as he best could despite their presence. He dressed, fed and washed himself, although it took hours to do so. As in the motor sphere, so also in mentation, he experienced an inability to hold on to an idea; this perplexed and dismayed him. As he was about to concentrate on a thought, a new idea compelled his attention and carried the other one away. He became very irritable, whenever he could not make his listener comprehend his slurred, irregular, staccato-like, rather unintelligible speech.

H. M., IV-22, experienced his choreic movements as a disgrace. He thought they were looked upon as alcoholic manifestations, so he tried to restrain them whenever he was on the street. For a time, E. M. A., III-13, likewise experienced her tics as something disgraceful because her relatives and friends looked upon her behavior as that of a child.

Inability for quietude, clumsiness and motor explosiveness aroused considerable irritation.

III. Sensorial-Intellectual Defects Caused by Organic Lesions.

As the disease process advanced our choreatics experienced altered contents, part of which were brought on by sensorial-intellectual defects. These manifestations were experienced in different ways by the diseased people and, likewise, in a fluctuating

fashion by the same choreatic individual at different times during the course of his affliction. These changes were experienced by some (J. S. M., II-4, G. P. M., IV-23) in a depressive way; by others (J. S. M., II-4, G. L. M., II-5, G. P. M., IV-23) in an elated fashion and, at times, in an alternating manner. Once started, for a time the way of experiencing persisted in being sad or cheerful, regardless of whether the experiential content was pleasant or unpleasant. Not infrequently our patients became irritable when experiencing mental failure. On the contrary, G. P. M., IV-23, enjoyed dramatizing himself despite his deficiencies, and he was pleased at being made the center of attention. Later on these patients grew more and more indifferent. As deterioration increased, their impressibility (that is their ability to personalize stimuli), and their whole capacity to experience gradually became minimal.

In contrast, as the deteriorating process advanced, the spouses and the relatives experienced the situation in a more disturbed fashion than the patients themselves.

IV. Socio-Economic Incapacitation Brought on by the Malady.

Socio-economic incapacitation eventually made its appearance in each case. All the choreatics were unable to maintain their positions. Their spouses had to go to work to support them. As financial resources dwindled, the question whether to break up housekeeping or not became paramount. The choreatics experienced this socio-economic turmoil at first with great anxiety which later gave way to indifference. Unable to live independently, L. M., IV-20, O. M. S., IV-21, H. M., IV-22, and G. P. M., IV-23, were all returned to their mother, the wife of F. M., III-12, who was devoted to her sick children. She was even said to have welcomed their dependence on her, and she cared for them until hospitalization became imperative. Despite her pride, she soon had to accept community aid.

V. Marriage and Transmission of Hereditary Taint.

Our choreatics and their parents tried to keep the hereditary taint in the family tree a secret. They all denied that their illnesses

were in any way alike or transmissible. They were selfish in their desire to marry and rather unconcerned as to the possibility of transmitting the hereditary taint. Only one of our choreatic patients, O. M. S., IV-21, practiced birth control. B. J. M., I-2, continued to have children even after the choreic movements were quite manifest.

The mates of these sick persons felt cheated when they discovered the nature of the malady after their marriage. However, one of them only, the first wife of G. P. M., IV-23, obtained a divorce. Nevertheless, some of the spouses said that they would not have married these individuals who harbored the disease, if they previously had known about the hereditary taint.

Whenever the wife of F. M., III-12, was pregnant, she wished that her children would be born dead. She gave her children herbs to ward off the illness. But she did not warn the prospective mates of any of her children of the presence of the taint in the family.

VI. Possibility of Development of Hereditary Chorea.

The way some of these individuals experienced the possible onset of Huntington's chorea was immensely tragic. At middle age, H. M., III-14, experienced with great anxiety the possibility of developing the chorea which his sister and brother already had. It is very likely that there might have been a relationship between his development of an alleged angina pectoris and his worrying. His wife, at first, denied that he was a member of the afflicted family. When she later admitted it, she pleaded for secrecy from members of her community. This protective attitude of hers betrayed her emotional concern.

The wife of H. M., IV-22, whose husband and first son had degenerative chorea, experienced the possibility of her second son, H. M., V-35, developing chorea with over-solicitousness and over-protectiveness. Although she denied any worry on his or her part, she was afraid to have him interviewed or examined lest he learn anything about the disease. She had a strong desire to try to "forget" the entire situation.

The first wife of G. P. M., IV-23, had three children, E. M., V-36, M. M., V-37, G. M., V-38, by him. These four people

recently found out the hereditary nature of his illness. They went into a terrific emotional turmoil. The mother went to acquaint the parents of her daughters' fiances of the hereditary taint in the family. Her daughter, E. M., V-36, who already had a head nodding tic, which may be ushering in the chorea, became depressed and uttered suicidal ideas. She and her sister M. M., V-37, were ambitendent in regard to the problem whether or not they should break off their engagements. The brother, G. M., V-38, tried to maintain an optimistic outlook. Neither the mother nor the three children wanted to learn anything more about the disease but they all wanted to try to "forget" it.

The offspring of S. M. M., II-3, in which the chain of choreal transmission had been broken, were very secretive as to the presence of an hereditary taint in their family tree. They circulated stories to the effect that the degenerative condition arose in B. J. M., I-2, because she had too frequent sexual intercourse, because she had children in too rapid succession, and because she was neglectful of her personal hygiene.

VII. Neuropathic and Psychopathic Traits.

Offspring of these diseased individuals not only experienced hereditary chorea, but also numerous neuropathic and psychopathic traits which are not uncommonly found associated in choreatic family trees. There were a number of "organic" neurological conditions found in the family tree, namely, feeblemindedness (W. M. B., IV-17, C. D., V-27, M. E., V-30); epilepsy (L. M., IV-20); infantile convulsions (M. M., III-10); spinal meningitis (G. M., IV-19); and acute rheumatic fever * (G. M. A., IV-24). We are not in a position to evaluate these observations from the experiential aspects.

As far as psychopathic traits are concerned, worriment, irritability and sensitiveness were found in many members of this family. These traits understandably influenced their ways of experiencing in not a few instances.

* Acute rheumatic fever is listed here with neuropathic traits only because of its association with Sydenham's chorea.

SUMMARY AND CONCLUSIONS.

The *way of experiencing* as a psychiatric concept was discussed.

A study of the experiential aspects in five generations of Huntington's chorea embodying 38 individuals of whom 10 were choreatics, was undertaken.

As personality changes appeared in our patients, changes in the ways of experiencing and in *experiential contents* occurred. Such changes were discussed and illustrated with the experiences of individual patients.

Organic drivenness, and the ways in which it was experienced, were discussed.

The sensorial-intellectual defects, due to organic brain lesions, were experienced in various ways, namely, with depression, with euphoria, with irritability or with apathy.

The socio-economic incapacitation was experienced by the choreatics at first in an anxious, but later, in an indifferent way.

Members of our family tree were selfish in their desire to marry, and they were rather unconcerned as to the possibility of transmitting the hereditary taint.

The possibility of developing hereditary chorea was experienced chiefly in an anxious way.

Certain neuropathic and psychopathic traits were mentioned.

As personality changes set in, the patient's way of experiencing was, as a rule, characterized by anxiety, while the mates and relatives were less concerned. However, as the neurological and psychiatric manifestations became pronounced, the patients grew increasingly indifferent, whereas their kin and their spouses became more concerned.

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DEPRESSIONS WHICH FOLLOWED APPARENT SUCCESS.*

By CHESTER L. CARLISLE, M. D.,
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In most animals, including man, the archaic pattern of behavior following sudden frustration consists in initial fear, often followed by rage. Unless the frustration is somehow overcome the subject falls into a more or less severe and prolonged depression—a "reactive depression." From a psychologic viewpoint, this train of manifestations may be regarded as a reaction to a threat against ego satisfaction; and subsequent behavior has for its goal the placing of the ego in a situation more favorable for restoring ego satisfaction, either through fight or flight. If either fails, then the episode leaves behind some damage to the ego's own estimation of self.

Usually, the frustration which precipitates a reactive depression seems to be something fairly obvious. The relatives say it was some disappointing experience, such as marital infelicity, financial reverses, the death of a loved one, or failure to achieve a cherished ambition. No doubt some such thing was the *precipitating* factor; but there remain other and *deeper factors* to be searched for, which are, often, *constitutional psychosexual factors.*

The importance of such endogenous etiologic factors is most strikingly demonstrated in depressions which are precipitated by a situation or episode apparently not of frustration, but of success; and it is the main object of this communication to report some cases of this sort.

In the presence of insight into an existing constitutional psychosexual dysharmony, the subject may attain resignation and an adjustment in life by foregoing his heart's desire; but in the absence of such insight, a subject thus handicapped suffers chronically from a vague and unexplained dissatisfaction and, upon achieving success, finds it disappointing—for it has but the effect

* Read at the ninety-fourth annual meeting of The American Psychiatric Association, San Francisco, Calif., June 6-10, 1938.

of intensifying the poignancy of his dissatisfaction and a fatal lowering of the ego's own estimation of self.

Thus develop those unexpected depressions in the midst of apparent success, even if we are rich in money and other material things and when, to the casual observer, the situation is all roses. When suicide follows, the newspaper story reads, "No motive known; his accounts are all in order; his family life seemed ideal; his relatives are quite unable to explain his act."

Persons of normal psychosexual make-up fall in love without reservation and have no difficulty in adjusting their behavior to the affective demands arising in the situation; but this is just what the psychosexually handicapped man or woman is unable to do; and thus a psychosis develops, representing a flight from an undesired and irremediable psychologic situation.

Following are illustrative cases.

CASE 1.—Male, white, American, aged 43 years. Father a drinker. Since childhood ambitious, worked his way through high school, later took night courses, read books from the library, "to give me more poise"; seclusive, sensitive, habits good, strictly moral. Worked for several years for a rubber company, then served in the army during the World War in 1917 and 1918; then returned to the rubber company and soon promoted to position of general manager of a branch office.

Married in 1926; no children; then obtained a better position with another company; was extremely interested in the new work, worked late nights, sometimes until 2 a. m., paid no attention to wife or social obligations.

Psychosis developed in August, 1929: complained of being overtired, said his employer was working against him, people spying on him, "as though I had stolen a pair of shoes; I think it was jealousy; people always have been jealous of me."

He jumped from the fourth story of a building, sustaining compound fractures of left humerus, femur and leg bones, was taken to a general hospital, and later, November 13, 1929, was admitted to the Veterans Administration Facility, New York City. On admission he said: "The only thing that was going through my mind at the time was that some one was after me and I could not escape; when I look back now, I think it was a hallucination of my own mind." Wounds became infected, left leg had to be amputated at middle of thigh. He said the people at his place of business talked about him, were envious of him, "because I was usually better dressed; had more business ability, and my wife was prettier than theirs; I thought they might be a service organization because of the nice way they treated me. I have always been interested in the subconscious, because I have always lacked poise and that is what I wanted to improve in."

Depression continued through 1930; at times refused food, would not take medicine, would not answer questions; depression was aggravated following

wife's visits; in January, 1931, had a spell of agitation, beat his head against bed post, tore up insurance policy of which the wife was beneficiary, refused to endorse his checks to his wife; read the Bible a great deal, then said he had a revelation, but would not explain. Around June, 1931, showed some distinct improvement.

CASE 2.—Male, white, American, aged 42 years. Mother was psychotic, died at 40 of tuberculosis. Graduated from a teachers training school, taught school, was principal of a grammar school. At 28 years enlisted in the army for the World War, soon commissioned as second lieutenant. After the war worked in a bank; married at 31 years; worked up to position of assistant cashier. In April, 1931, was transferred to the head office of the bank, placed in charge of the loan department, and had his salary raised to $200 per month. In the new position he worked hard and long hours, became tired out and in August, 1931, went away for a rest. In October, 1931, received a second promotion, being appointed to the position of manager of a branch bank. In about three weeks definite psychotic symptoms appeared: could not sleep, became despondent, worried without cause about his finances, developed ideas of sinfulness with reference to early sex indiscretions, said he was inferior to his wife, had to quit work again. At home he failed to show improvement; on December 20, 1931, attempted suicide by drinking two small bottles of iodine, then told his mother about it, was taken to a general hospital, then to a private sanitarium, finally, on July 24, 1932, admitted to Veterans Administration Facility at Palo Alto, Calif. There he was noted as being well oriented but depressed, apprehensive and delusional: ideas of ridicule by his father when he was a child; brother cast spells on him; ideas of sinfulness; restless and agitated, chews paper, twists paper around his fingers, untidy. He said: "I feel like a little child. Oh, it is terrible! What does it mean? My father and mother knew all this; why didn't they tell me? My father appears to me, talks to me; my mother appeared last night, sitting in her chair, her feet and hands incarcerated; called my name, Oliver, Oliver! Isn't that a terrible name? I wish I had a different name; it would not have been so bad if I had had another name. My brother, Ward G.—G. stands for God—since I was a small child God has influenced me."

SUMMARY AND CONCLUSIONS.

Two cases are cited, in which psychotic breakdowns occurred with manifestations of ego frustration, following upon the heels not of some discouraging episode, in the manner of an ordinary reactive depression, but paradoxically, upon attainment of financial and social success. No outstanding marital difficulties were consciously realized, yet in both cases the psychotic content had clear reference to psychosexual and marital maladjustment as an important element in the picture.

In both cases the situation may be regarded as based on a fundamental and irremediable disharmony of psychosexual make-up. Upon such a background apparent success serves but to bring about an exacerbation of the chronic undertone of self-dissatisfaction and ego-frustration.

Thus are to be explained the depressions with subsequent elaborations consisting of ideas of sinfulness, guilt, inferiority and a destined suicidal trend which presents itself to the patient, eventually, as the sole avenue of retreat, occasioned by lack of psychosexual ego-satisfaction, even though the patient may possess all of the world beside. The clinical expression of the psychosis is dependent on whether the patient's personality is mainly syntonic or schizoid in type.

DISCUSSION.

DR. EDWIN W. ALLEN (Milledgeville, Ga.).—Dr. Carlisle, by utilizing psychological facts and Freudian concepts, has given us an interesting hypothesis of the cause and development of some reactive depressions. The hypothesis is rather broad and could be applied to any of the depressions, the simple reaction to a certain described life situation, or to the depression phase of a manic-depressive psychosis or to depressions occurring in the involutional period.

DR. AARON J. ROSANOFF (Los Angeles, Calif.).—The subject that Dr. Carlisle takes up, namely, depressions occurring in reaction not to a painful situation, but to one that is apparently an encouraging one, is, as far as I know, original on the programs of our Association. Yet I am very sure that the experiences reported by him are not new. Probably there is not a person in the room who has not observed similar happenings in the course of his practice.

I doubt if a month ever goes by in my own work without my coming across a situation wherein, as I seek to determine what it is that the patient strives to attain, and as I apparently succeed in the quest, the patient is made worse instead of better when he has been helped toward his wished-for goal. Whether this thing happens invariably on a basis of chaotic sexuality, as apparently Dr. Carlisle believes, or whether it can occur on a basis of other types of conflicts, I am not sure.

I wish to congratulate Dr. Carlisle on bringing this subject to the attention of the Association in such a way as probably to provoke further discussion of it in the future, perhaps with more detailed analyses of the situations and more cases.

DR. CHESTER L. CARLISLE.—I was glad to hear Dr. Rosanoff say that it is somewhat of a novel approach, a new presentation. I think it has practical value in the evaluation of many every-day situations, including those unexplained suicides that we read about in the headlines of newspapers.

Correspondence.

COMMISSIONS IN LUNACY.

To the Editor, American Journal of Psychiatry:

In the July issue of The American Journal of Psychiatry (pages 219 to 225 inclusive, double column, small type) appears an extraordinary document entitled "The Report of the Commissioners in Lunacy—The Case of the People *vs.* Robert Irwin." Although the report was published without comment, the mere fact that it appeared in the Journal may be taken by some casual readers to imply that it has the approval of the editorial staff. For this reason I venture to offer a few remarks on the report, which seems to be at variance with modern and progressive standards in forensic psychiatry.

The defendant, Robert Irwin, is alleged to have killed three persons in an apartment in New York City in March 1937 and to have surrendered voluntarily to the police three months later, at that time making a purported confession. In view of certain reported statements of the defendant as well as one of a police official to the effect that Irwin probably would never be convicted because of being mentally deranged, the court seems to have deemed it advisable to secure advice as to the defendant's mental condition. Although the law permits the court in its discretion to commit the defendant to a mental hospital for observation, and although this procedure was urged upon the court by the defense counsel, the provision was not utilized; instead, that providing for the appointment of a commission of three "disinterested persons" was employed. The law requires only one of the three to be a "qualified psychiatrist," but in this instance the commission was made up of two such "qualified psychiatrists" and one attorney. It is the report of this commission, said to be the result of 22 hearings and 10 executive sessions, with the taking of testimony amounting to 756 typewritten pages, which is published. Formerly the law relating to lunacy commissions provided that the function of the commission was to determine only whether or not the defendant was in suitable

mental condition to stand trial. In 1936, however, a provision was added that the commission should likewise report as to the mental condition of the defendant at the time of the alleged crime, that is, his "sanity."

The first impression which one gains from the reading of the document is that it was penned by a lawyer, since it is couched almost entirely in legal terminology. The attitude expressed is that of an inquisition. Long excerpts from statements made by the defendant to the police are given. The report indulges in long discussions, fortified by numerous quotations from legal decisions, regarding such matters as the legal definition of insanity, and the meaning of the words, "nature and quality" and "wrong."

"Partial insanity" and "insane delusions in respect of matters unrelated to an alleged crime" are referred to without the observation that they are not a part of the psychiatric vocabulary; this terminology antedates the hoary McNaughten Rule, and is so patently unsound as to have been rejected by the courts of several states. The atmosphere permeating the entire proceeding was, from the description given, about as far removed from that of a consultation or psychiatric examination of a patient as could well be imagined. One passage which, if it did not deal with a matter of possible life or death, might be considered comic, describes how the commission went to Irwin's cell, accompanied by a representative of the District Attorney, Irwin's counsel, the stenographer, and the warden: "The chairman of the commission, standing at the barred door, stated in a voice so loud that Irwin could not fail to hear it, that the commission had come to interrogate him and to take his testimony, that the commission entertained no prejudice for or against Irwin, but was engaged in the performance of duty under an order of the court." It adds, "Irwin remained silent." On another similar occasion, it states, Irwin pushed a heavy table against the door, apparently for the purpose of preventing the admission of the large and imposing group. The report continues to complain that "Irwin frequently stated to his prison keepers that he was averse to appearing and never would appear before and answer the questions of the lunacy commission, and that he explained that what he wanted was a trial by jury." In view of some of the New York decisions it would appear that Irwin was entirely within his rights on this matter! The rather casual tone of the

report in stating that "the fact that Irwin has been from time to time under treatment for mental disorders has not been overlooked by the commission, nor the fact of his superficial attempt to self-mutilation that he might, as he explained, concentrate his genius on his art" suggests that the commission was not so neutral as it professed to Irwin to be. Most remarkable of all is the statement that "the fact that in reaching its conclusions the commission has not been able to interrogate Irwin should be noted *in passing.*" (Italics supplied.) In other words, two physicians who happen to be members of The American Psychiatric Association were found who were willing to take their oath covering the "responsibility" and mental fitness for trial of a defendant charged with murder, concerning whose previous history they give but little detail, whose five mental hospital residences they pass off cursorily, and whom they have never interviewed or physically examined.

One of the fundamental principles of modern-day psychiatry is the importance of a longitudinal section in a study of the patient as casting light upon failure of adjustment. If the medical members of the commission feared that in taking the defendant's history they might not be acting the part of good lawyers, reference to the case of People *vs.* Carlin, decided by the New York Court of Appeals as long ago as 1909, should have heartened them considerably. In that case the court remarked, "The whole previous career of a man in a general aspect, at least, may throw some light on his mental condition at the time when he is alleged to have committed a criminal offense and when insanity is relied upon as a defense in his behalf." This judge was not a stranger to psychiatric enlightenment. Thus the full and complete history of the previous life of this man, a man who has been five times in a mental hospital, was not taken. Moreover, it seems incredible that any psychiatrist should venture an opinion without having even talked to the patient. True, the defendant refused to talk to the commission; but the members of the commission were equally at liberty to refuse to express an opinion! So long as medical men, called into court to advise, attempt to talk like lawyers, employ only legal verbiage, venture opinions without adequate clinical foundation, and in turn fail to present the attitude and viewpoint of disinterested scientific men, just so long will psychiatry fail to command from the courts and the legal profession that measure of respect which is its due.

The abolition of such lunacy commissions as the one responsible for the report here discussed would be highly desirable. As a matter of fact, it became necessary two years ago to limit the fees paid to members, as the excessive costs had reached almost scandalous proportions. At the 1938 session of the New York Assembly a bill passed both houses which would have substituted hospital observation for the present cumbersome and legalistic procedure; it was vetoed, however, on technical grounds.

Very truly yours,

WINFRED OVERHOLSER, M. D.,
Chairman, Committee on the Legal Aspects of Psychiatry.

Comment.

THE CHANDLER-WALLIS ACT, KENTUCKY.

At a special session of the Legislature of Kentucky, called by Governor A. B. Chandler to consider the needs of the state hospital system, an important law was enacted. In compliment to the Governor and the Commissioner of Welfare, the bill was entitled The Chandler-Wallis Act. The final vote was unanimous.

There is established within the Department of Welfare a Division of Hospitals and Mental Hygiene, with broad authority for the administration of institutions and for the development of a mental hygiene program looking towards prevention. In the sections outlining its responsibilities, the following words find place: coördination, creation, custody, psychiatric treatment, general supervision. The various types of mentally handicapped persons are mentioned, including those in penal and correctional institutions and dependent children.

Imitating procedure long employed in Kentucky for the choice of a Commissioner of Health, it is provided that the director of the new division shall be selected from a list submitted by the Council of the Kentucky State Medical Association. It is provided that he and all officers and employees in the division shall have the protection afforded by a trial of any charges preferred.

Qualifications are set up for the director, the assistant director, superintendents, clinical and educational directors and several department heads in the institutions. A salary schedule is provided, more liberal in some items than what has previously prevailed in that state. It must be remarked that unless this schedule is supplemented in the case of the director, it will sometimes be difficult to fill the position with a person of adequate experience and standing.

Authority is granted for social work (under another title), for transfers of patients and personnel, for inspection, for service to courts, for discharges.

A notable advance is found in two provisions for admission. Patients may be received on a voluntary basis and on the request of the health officer, for a ten-day period of study.

In some respects the most startling section is quoted in full:

> Neither the Director of the Division of Hospitals and Mental Hygiene, Assistant Director, nor superintendent of any hospital or institution shall be permitted to engage in any political campaign, and any political activity on the part of such officer or officers shall be considered as cause for dismissal; provided that any officer accused of such political activity shall have charges preferred against him and given the benefit of trial as provided in Section 7 of this Act.

This legislation is designed to place the treatment of the mentally sick and the training of defectives in Kentucky on an excellent plane. The same bill carried additional appropriations that make the program actually possible to put into effect.

Those who have worked to bring about this advance include a notable group of physicians (several of the members of The American Psychiatric Association), publishers and other persons active in the social and political life of the commonwealth.

S. W. H.

TRIBUTE TO DR. HUTCHINGS.

On October 5, 1938, at the Utica State Hospital there was dedicated a new building designed for intra and extra educational purposes, and to be known as Hutchings Hall. The front wall of the building bears a bronze plaque with this inscription—

> This building is named to commemorate the services of Richard Henry Hutchings, physician, teacher, administrator, superintendent of the Utica State Hospital, who has devoted his life to the welfare of the unfortunate.

It is particularly appropriate that this event should have taken place during the year of Dr. Hutchings' Presidency of The American Psychiatric Association. It also signalizes the thirtieth year of his service to New York State. That the value of this service was duly recognized is evidenced by the fact that at the dedication services there were present to pay tribute to Dr. Hutchings the presidents of five upstate colleges, each of whom contributed to the program. The State of New York was represented by Dr. William J. Tiffany, Commissioner, State Department of Mental Hygiene, and Dr. Frederick W. Parsons, the former Commissioner. Dr. John A. DeCamp, superintendent of the Utica Public Schools,

and Dr. H. G. Weiskotten, dean of the Syracuse Medical School, also participated.

Hutchings Hall is a modern, two storey assembly building, in which will be centered the various educational and recreational activities which Dr. Hutchings has developed as an essential part of the administrative program of a great state hospital.

On the evening of the dedication there was given also the first of a series of six lectures on the theme "The Attainment of Social Security Within the Personality." These lectures are given under the auspices of the Oneida County Mental Hygiene Committee with the cooperation of the New York State Committee on Mental Hygiene of the State Charities Aid Association, and The National Committee for Mental Hygiene. The first lecture "Home and Family Life" was given by Dr. Arthur H. Ruggles, superintendent, Butler Hospital, Providence, R. I.

News and Notes.

CHILD GUIDANCE CLINIC IN NEW ORLEANS.—A clinic for child guidance has been established in New Orleans, to be operated in close association with the departments of medicine of Tulane and Louisiana State Universities. The new clinic has been made possible through the contributions of Mr. Samuel Zemurray, president of the United Fruit Company. Dr. Martha Wilson MacDonald, who for three years has been in charge of the children's division of the department of psychiatry at Michael Reese Hospital in Chicago, has been appointed director of the New Orleans clinic. Her successor at Michael Reese Hospital has not yet been named.

PROGRAM 1939 MEETING.—The Council requests that readers of papers to be illustrated by slides or films communicate with Dr. John D. Reichard, U. S. Marine Hospital, Ellis Island, N. Y., as soon as they are informed by the Committee on Program that their contributions are accepted.

Those having photographs or other illustrative material they wish shown at the next meeting will also please notify Dr. Reichard.

SIGMUND FREUD FELLOWSHIP.—The Boston Psychoanalytic Institute announces three Sigmund Freud Fellowships in Psychoanalytic Training, to begin September, 1939. The fellowships are open to graduates of a Class A medical school, who have had at least one year general hospital training, and two years' work in psychiatry. Applications must be in before February 1, 1939.

For further information, write to Dr. M. Ralph Kaufman, Chairman of the Educational Committee, 82 Marlborough Street, Boston, Massachusetts.

THE ROCKEFELLER FOUNDATION. A REVIEW FOR 1937. BY RAYMOND E. FOSDICK.—This represents a summary of the work of the Rockefeller Foundation for the year 1937. The purpose of

this Foundation is stated generally as "the advancement of knowledge." Emphasis at the present time is being placed on psychiatry in the medical sciences, experimental biology in the natural sciences, the development of a trained personnel and the study and control of certain diseases in public health, such problems as international relations, social security and public administration in the social sciences, and in the humanities, on efforts which tend to raise the general culture level and to promote cultural interchange between countries. Each of these fields are dealt with individually.

A note of discouragement is sounded in the section entitled "New International Barriers." The Foundation has been guided by the objective "The well-being of mankind *throughout the world.*" This ideal, which for more than two decades the Rockefeller Foundation has consistently attempted to follow, has in recent years encountered several difficulties. And these difficulties are increasing. Intolerance, repulsion and compulsion that the world has recently evidenced are resulting in the progressive disintegration of creative scholarship, and this is seriously affecting the program of the Foundation.

During the year 1937 the Rockefeller Foundation appropriated a total sum in excess of $9,500,000. Of this amount $2,400,000 was given to the medical sciences, $2,200,000 to public health, $2,000,000 to the social sciences, $1,100,000 to the natural sciences, $800,000 to the humanities, and $400,000 to rural construction in China. It is interesting to note that appropriations of $1,602,100 were made towards psychiatry in the United States. Since 1932 when the program in psychiatry was initiated, the Foundation has given roughly $6,100,000 for this purpose.

Of special interest is the section entitled "New Horizons for Culture." Here, emphasis is placed on the present day attitude towards culture, where there is evolving an attitude which regards culture as democratic and inclusive rather than aristocratic and exclusive. It is referred to as "the new renaissance of the human spirit." This is the basis upon which and the aim towards which the Rockefeller Foundation strives in its contributions and developments.

THE TAVISTOCK CLINIC. (THE INSTITUTE OF MEDICAL PSYCHOLOGY.) REPORT FOR THE YEAR 1937.—This represents a summary of the activities of the Tavistock Clinic for the year 1937.

The Tavistock Clinic was founded in 1920 and represented the first attempt to provide facilities for out-patient care of persons whose illnesses required psychological treatment. Every year has indicated increasing evidence of the value of such a clinic to the general field of medicine. The medical director states, "There is today a considerable agreement on the fundamentals of psychological medicine, and it should be possible to solve much of the nation's problem of mental ill-health if there were more doctors with special training in the treatment of the psychoneuroses. The educational work undertaken at the Clinic is perhaps for that reason its most important national contribution at the present time."

Some of the main activities of the Clinic are, briefly: research projects, the present interest being in the field of psychosomatic relationhips; follow-up work carried on by the Registrar's Department; attempts to assess the value of psychotherapy in the cases of delinquency, and occupational therapy projects.

There were 646 cases reported in the Children's Department, 341 of which were new cases. "The work of this department shows every evidence of becoming more widely appreciated and the demands on it are undiminished."

The work of the Social Service Department is reported in two sections, the Children's Department and the Adult Department. In the former, 327 visits were made and 647 interviews were given in the Clinic. There is an indication of increasing cooperation between social workers and the Mothers and Educational Departments. In the Adult Department 313 interviews were given and 21 home visits made.

The activities of the Educational Department are briefly: (a) the training of specialists to treat advanced cases of psychoneurosis (b) the training of general practitioners in the recognition and treatment of simpler forms of psychoneurosis, (c) training in the treatment of childhood disorders, so that they may be prevented from developing into adult forms of psychoneurosis, and (d) the training of teachers and others in the principles of mental health and the prevention of character disorders.

Special emphasis is placed on the financial difficulties with which the Clinic is faced, and a plea is made for further financial support to carry on with this constructive and much needed program.

WPA INDEX OF RESEARCH.—The results of some 2000 research projects carried on as part of the federal work relief program are summarized briefly in a digest and index which has been published by the Works Progress Administration. This volume of 291 pages contains a concise statement of the principal conclusions of each study and an alphabetical subject index to the contents. The reports on these projects touch upon nearly every field of natural and social science and many of them have appeared in the form of articles in scholarly journals. However, several hundred of the reports summarized in this index are in manuscript form, and arrangements have been made with the American Documentation Institute whereby micro-film copies of the original reports will be furnished at nominal rates for the use of research specialists. A small edition of this volume has been prepared for distribution to the larger public and university libraries, where it will be available for reference, and for government departments, industrial concerns and research foundations. A limited supply of copies of this Index of Research Projects are still available. Requests should be addressed to the Works Progress Administration in Washington.

THE A. A. A. S. SYMPOSIUM ON MENTAL HEALTH.—A unique feature of the annual winter meeting of The American Association for the Advancement of Science to be held at Richmond, Virginia, will be a three day symposium on mental health, December 28 to 30, 1938, arranged by the Section on Mental Sciences.

Under the general chairmanship of Dr. Walter L. Treadway a program has been arranged through the collaboration of The American Psychiatric Association, the U. S. Public Health Service, the Mental Hospital Survey Committee, and The National Committee for Mental Hygiene.

In providing this symposium the A. A. A. S. for the first time in its history presents the problem of mental health and ill health

as a major feature on its annual program. The sessional topics, as proposed, are as follows:

Session 1, December 28, forenoon. Orientation and methods in psychiatric research, Dr. Nolan D. C. Lewis, chairman.
Session 2, December 28, afternoon. Sources of mental illness, treatment and prevention, Dr. Abraham Myerson, chairman.
Session 3, December 29, forenoon. Economic aspects of mental health, Dr. Joseph Zubin, chairman.
Session 4, December 29, afternoon. Physical and cultural environment in relation to mental health, Dr. Harry Stack Sullivan, chairman.
Session 5, December 30, forenoon. Mental health administration, Dr. Clarence M. Hincks, chairman.
Session 6, December 30, afternoon. Professional and technical education in relation to mental health, Dr. Franklin G. Ebaugh, chairman.
Closing session, December 30, evening. Summary and address, Dr. C. Macfie Campbell.

LETCHWORTH VILLAGE SURVEY.—The findings of a survey of existing facilities for the care, treatment and training of the feebleminded at Letchworth Village, one of New York State's largest institutions for the mentally deficient, and recommendations for its future development, has been published this year under the title, "A Survey of Methods of Care, Treatment and Training of the Feebleminded at Letchworth Village."

Dr. C. E. A. Winslow, professor of public health at the Yale School of Medicine, who served as chairman of the survey committee, comments on the report, "The first quarter-century of Letchworth Village represents a notable chapter in the history of institutional care of the mental defective."

The report points out the significant fact that Letchworth Village represents a new era in the state's care of the mentally deficient, for as Dr. Winslow comments, "the establishment of a 'Village' rather than a 'Custodial Asylum'; the emphasis on normal healthy life for all the inmates; the hopeful attitude expressed towards trainability and restoration to the community of those susceptible of marked improvement; the recognition of basic scientific research as a fundamental responsibility; these were contributions of the first magnitude 25 years ago."

The cooperation of efforts from many sources has contributed to the constructive development of Letchworth Village. In this regard

Dr. Winslow comments: "A long succession of governors and legislatures have contributed to its support. An excellent State Department of Mental Hygiene has guided and assisted its development. A great executive, endowed with commonsense, sympathy and courage, built himself into its organization. A Board of Managers of unique vision and devotion—among whom the names of Franklin B. Kirkbride, its vital mainspring through all the years, and of Mrs. E. H. Harriman, who made the Research Department possible, must be mentioned with special gratitude—formulated its program and directed its policies. With the pursuance of the program and the continuation of such leadership the story of Letchworth's second quarter century should be as significant as the first."

SCIENTIFIC EXHIBIT AT THE CHICAGO MEETING IN 1939.—Ample space has been provided for the scientific exhibit at the next annual meeting of The American Psychiatric Association, to be held May 8-12, 1939, at the Palmer House, Chicago. The scientific exhibit offers an opportunity for investigators and visiting members to meet and discuss informally the various phases of the research work presented. The exhibit is also of special advantage to persons reading papers since the exhibit can be used to supplement the papers read. The scientific exhibit at the annual convention of the American Medical Association has come to be recognized as a week of opportunities for graduate education not equaled by any similar opportunity available to the medical profession. It is hoped that the scientific exhibit of The American Psychiatric Association will fill in the future the same purpose in the field of psychiatry.

The following topics for the purpose of general orientation are suggested: interesting material relating to research in new methods of treatment, clinical psychiatry, psychopathology, mental hygiene, child psychiatry, diagnostic methods, new laboratory procedures, neuropathology, neuroanatomy, etc.

Important aids toward a successful scientific exhibit are personal demonstration; plainly lettered posters; statement of purposes or justification of exhibit; and neatness and care in planning material. The Association furnishes wall space consisting of a beaver-board wall eight and one-half feet in height, and signs with the titles of the

exhibits and names of the exhibitors. Application for space with a short description of the exhibit material for the program, not exceeding 150 words, should be sent to the Director of the Scientific Exhibit, Dr. Walter L. Bruetsch, Central State Hospital, Indianapolis, Indiana, not later than March 1, 1939.

RASSEGNA DI NEUROLOGIA VEGETATIVA.—The first numbers (1 and 2 combined) of Vol. I of this new journal, published in Florence, bear the publication date May 30, 1938. Joint editors are Dr. Antonio Lunedie, director of the Institute of Special Pathology of the University of Siena and Dr. Giovan Battista Belloni, director of the Clinic of Nervous and Mental Diseases of the University of Sassari, assisted by an editorial board of 14 members representing various Italian clinics and universities.

The inaugural editorial points to the enormous strides which have been made in vegetative neurology within recent years, and to the fact that hitherto no publication has been devoted solely to this field. The *Rassegra di Neurologia Vegetativa* is undertaken therefore to supply a very real need. It will publish original articles, critical notes and comments, reviews of the literature, with systematic biographical notes of new publications.

Articles in the initial number include the following:

Physiopathology of Arterial Pressure by A. Lunedei; Transfrontal Hypophysectomy in Acromegaly with Diabetes Mellitus by G. W. Fasiani, G. B. Belloni and M. Quarti; The Importance of Certain Morbid Processes in the Cervical Cord in the Pathogenesis of the Syndrome of Dupuytren by A. Pacifico; Studies on the Myopathies by E. Liesch.

The present number contains 190 pages and is illustrated. The *Rassegna* will appear at irregular intervals, the annual volume comprising about 600 pages. The cost per volume is 70 lira in Italy, 130 lira in other countries.

DR. EARL D. BOND BECOMES DIRECTOR OF RESEARCH, DR. LAUREN H. SMITH, PHYSICIAN-IN-CHIEF AT PENNSYLVANIA HOSPITAL.—Dr. Earl D. Bond, after 25 years' service, relinquishes his post as physician-in-chief and administrator of the West Phila-

delphia Departments of the Pennsylvania Hospital, according to announcement of the Board of Managers. Dr. Bond continues to serve the hospital, however, in a new capacity, as medical director of research. This new work is now in his charge as part of the planned extensive development of the psychiatric work of the Pennsylvania Hospital in teaching and research. Dr. Bond, a graduate of Harvard University, has pioneered in the development of the field of psychiatry in this country for over 30 years, and received the Bok Award for 1932 as recognition of his part in the founding and opening of the Institute of the Pennsylvania Hospital in 1930. He is vice-dean and professor of psychiatry at the Graduate School and professor of psychiatry at the Under-graduate Medical School of the University of Pennsylvania, is a member of the State Welfare Commission, and holds numerous other psychiatric and advisory posts.

Dr. Bond has always objected to the custom which gave to the senior hospital psychiatrist the bulk of administrative duties. For this reason he has set the example by retiring as administrative head in order to devote the next five years to clinical psychiatry. He will teach in the highly organized Graduate School of Medicine, and also teach younger members of the hospital staff. He will put much time into the improvement of hospital records and follow-up studies. He will have time to keep in touch with research activities and to promote their extension among younger men on the staff. If by reason of the sale of land new plans for the hospital are necessitated, Dr. Bond will be free to give his time to the future development of the hospital.

Dr. Bond retires formally on November 30, 1938, a date which marks the completion of 25 years' service in the Pennsylvania Hospital, and of 25 years' collaboration with Dr. Strecker. Neither the hospital nor the personal association will be disturbed by the change.

Dr. Lauren H. Smith, who for 12 years has been actively associated with Dr. Bond and the hospital, succeeds him as physician-in-chief and administrator of the Department for Mental and Nervous Diseases at 4401 Market Street and of the Institute at 111 North 49th Street. Dr. Smith, a graduate of the University of Iowa, has been an executive member of both departments of the

hospital since 1926, and during his term of service has studied abroad and has acted as consulting psychiatrist to several colleges and institutions in the Philadelphia area. He is a member of the psychiatric teaching staff of the University of Pennsylvania.

THIRD INTERNATIONAL NEUROLOGICAL CONGRESS.—The Third International Neurological Congress will be held in Copenhagen, Denmark, from August 21 to August 25, 1939. In accordance with the usual custom four days will be devoted to the scientific sessions of the Congress. Three symposia will be held on subjects chosen by the Program Executive Committee. A morning and afternoon session will be devoted to the consideration of each one of these topics, one day being devoted to each subject. The following subjects will constitute the symposia:

1. The autonomic nervous system with special reference to the endocrine system.
2. Heredo-familial disease, especially from the genetic aspect.
3. Neurological aspects of the avitaminoses, with especial reference to the peripheral nervous system.

The programs for these special subjects have been planned by special chairmen and invitations have been issued to those particularly interested in these fields to prepare special papers for presentation before the Congress. Professor van Bogaert and Professor Pette have arranged the program for the symposium on the autonomic nervous system; Professor Guillain, for heredo-familial disease and Professor Monrad-Krohn, for neurological aspects of the avitaminoses.

The sessions of the Congress will be held in the Houses of Parliament in Copenhagen.

Five individual reporters will contribute the papers to the discussion of the three chosen topics, each communication being limited to 25 minutes.

One day of the Congress will be devoted to the presentation of short papers by active members of the Congress. No member will be allowed to present more than one communication. The presentation of these miscellaneous communications will be limited to 10 minutes. Insofar as possible these shorter papers will be grouped under appropriate topics and special individual sessions of the

Congress will be arranged for the presentation of these papers. Active members desiring to present short papers before the Congress must furnish to the Secretary of the Committee for the United States, a title and an abstract not exceeding 200 words on or before the first of March, 1939. These titles and accompanying abstracts will then be considered by the committee representing the United States and as soon as possible the contributor will be notified whether his paper has been tentatively accepted. Those titles accepted by the committee representing the United States will then be forwarded together with the abstracts to the Danish Program Committee for final action. Proposers of papers will probably be notified on or about May 1, 1939 whether the paper has been accepted by the Danish Program Committee.

In accordance with the usual custom, Wednesday of the week of the Congress will be devoted to excursions in the vicinity of Copenhagen.

Membership in the Congress will comprise active and associate members. Applicants for active membership must belong to some national or local neurological, psychiatric, or neuropsychiatric association or society and must secure endorsement of their application by their local association or by some neurologist or psychiatrist known to the United States Committee. The fee for active membership is $8.00.

Members of families, physicians in other specialties and non-medical individuals engaged in fields of activity associated with neurology and psychiatry may apply for associate membership. The fee for associate membership is $4.00. Application blanks for active and associate membership may be obtained by application to the Secretary of the Committee for the United States.

The American Express Company has been appointed as the official travel agency for the Third International Neurological Congress. In order to obtain the most satisfactory results, arrangements for travel or for hotel accommodation should be made through the American Express Company. Arrangements for travel may of course be made through any travel agency but in order to secure suitable hotel accommodations in Copenhagen, arrangements for rooms should be made through the American Express Company. In view of the considerable number of persons expected to attend

the Congress and the relatively limited accommodations existing in Copenhagen early application for room reservations should be made.

Canadian neurologists and psychiatrists interested in attending the Congress should communicate with Dr. Wilder Penfield, Vice-President representing Canada.

The officers of the Third International Neurological Congress are as follows:

Honorary Presidents: Dr. Gordon Holmes, Dr. B. Sachs, Sir Charles Sherrington.
Honorary Member from United States: Professor Harvey Cushing.
President: Professor Viggo Christiansen.
General Secretary: Dr. Knud H. Krabbe.
Local Secretary: Dr. C. J. Munch-Petersen.
Treasurer: Dr. Einar Sorensen.
Editor of Transactions: Dr. Knud Winther.

The Vice-Presidents of the Congress have been chosen from 22 constituent countries, one from each locality.

Transactions consisting of abstracts of presentations and discussions together with other pertinent details concerned with the conduct of the Third Congress will be published in due course of time after the conclusion of the Congress.

As no title or abstract will be accepted by the Danish Program Committee unless at that time the author is an active member of the Congress, application blanks for membership properly filled out together with check in payment of the membership fee should accompany the submission of the title and abstract.

Dr. B. Sachs, *Chairman*,
Dr. Henry Alsop Riley, *Secretary*,
Dr. Foster Kennedy,
Dr. John Fulton,
Dr. S. W. Ranson,
Dr. Stanley Cobb.

Massachusetts Commissioner of Mental Health.—Dr. Clifton T. Perkins, who for some time has been acting as Commissioner of the Department of Mental Diseases of Massachusetts, has been appointed Commissioner by Governor Hurley. Under the new law the title of this office has been changed as above captioned.

MEYER CLINIC AT RHODE ISLAND HOSPITAL.—The State of Rhode Island has honored Dr. Adolf Meyer by naming in his honor the new neuro-psychiatric clinic building at the State Hospital for Mental Diseases at Howard, R. I.

Dr. Meyer, speaking at the dedication of the new clinic, October 18, 1938, discussed the new emphasis of psychiatry upon prevention and recovery. He said:

> Psychiatry, from being the job only of the administrator and of the alienist, has come to be a theory and a practice reaching most helpfully and constructively into the shaping of happiness and correction of difficulties also of average life. Through psychiatry the diseases that have led to the tradition of secrecy and segregation and suspicion and unwholesome dread are now slowly yielding to a totally different constructive determination, a general hygiene of individual and social and community life leading up to concern in the persons determining the fate of nations and races.

In his address Dr. Meyer paid tribute to Dr. G. Alder Blumer as "the Nestor of American psychiatry"; he also commended Dr. Arthur H. Ruggles of Providence, who acted as chairman of the meeting, and Dr. Arthur P. Noyes formerly superintendent of the Rhode Island State Hospital and now at Norristown, Pa., under whose administration most of the new construction was planned.

Dr. Meyer delivered his address in the afternoon at the annual meeting of the New England Psychiatric Society held at the State Hospital and in the evening was guest of honor at a dinner in the University Club which was attended by about 75 psychiatrists and neurologists. Among the physicians present were: Charles H. Dolloff, superintendent of the New Hampshire State Hospital; Kenneth J. Tillotson, psychiatrist-in-chief of the McLean Hospital, Boston; Forrest C. Tyson, superintendent of the Maine State Hospital; Eugen Kahn, professor of psychiatry at Yale University; Chester Waterman, president of the New England Psychiatric Society; C. Charles Burlingame, psychiatrist-in-chief of the Neuro-Psychiatric Institute of the Hartford Retreat; Clarence A. Bonner, president of the Massachusetts Psychiatric Society; William A. Bryan, superintendent of the Worcester (Mass.) State Hospital; J. C. O'Neil, superintendent of the Vermont State Hospital; Tracy Putnam, president of the Boston Society for Neurol-

ogy; C. Macfie Campbell, director of the Boston Psychopathic Hospital.

Dr. Campbell outlined Dr. Meyer's contributions as a teacher, author and lecturer during the past 40 years. As evidence of the fruit of Dr. Meyer's labors he pointed out the large number of physicians who had received special training under him and who now hold positions of leadership as teachers, clinicians and research workers in psychiatry.

In presenting Dr. Meyer to the audience, Dr. Arthur H. Ruggles referred to him as "a wise scientific leader of psychiatry who has piloted the bark of this developing branch of medicine through its years of growth—avoiding the many pitfalls of new cults—always searching for scientific truth."

Association of Former Patients of the Psychiatric Institute, University of Illinois.—This Association held a public meeting October 27, 1938, at the University of Illinois College of Medicine, the object being to gain public support for legislative changes proposed in commitment procedures in the State of Illinois. Representatives of the leading civic organizations were invited, and the meeting was addressed by representatives of the University, the State Department of Public Welfare, the Illinois Society for Mental Hygiene and other civic bodies. As a special feature addresses were made by one male and one female patient who had recovered following pharmacological shock therapy, also by the father of a third patient. More than 500 patients, relatives and friends attended this meeting.

The Association of Former Patients was formed in November 1937, and has a membership of more than a hundred patients who have been discharged from hospital after receiving shock treatment. More than 200 relatives of patients are also enrolled as associate members. The principal objective of the association is to combat the idea of a stigma attaching to mental illness. To this end it proposes legislative action to spare the mental patient and his family the humiliation of the court record.

The Association issues a bulletin which is to appear bi-monthly and will be devoted to the welfare of patients and former patients. The first issue appeared in July, 1938, and contains several contribu-

tions by patients who have recovered, and who relate their experiences for the benefit of others. In an introductory note to the first issue Dr. H. Douglas Singer says:

> The present movement is unique in that it presents the united front of many persons who have regained their health. Because of this it reaches into homes widely scattered throughout the community. It is thus not a matter of propaganda but of neighbor talking to neighbor about matters of which he knows by personal experience. The possibilities of bringing about a truly popular education and understanding are thus enormously enhanced.

Book Reviews.

PSYCHIATRIC NURSING. By *William S. Sadler, M.D.* (St. Louis: C. V. Mosby Company, 1937.)

A clearer idea of the content of this book would perhaps be given by the title "Psychiatry for Nurses." The book is in four sections. The first, called "General Considerations," gives a very brief history of psychiatry, and there are chapters on the anatomy of the nervous system, on the endocrine system, medical psychology, mental mechanisms, the theory of the subconscious, phantasy and reality, causes of mental nervous disorder, and classifications. There has been an attempt to cover an enormous field, resulting often in the most hasty treatment, sometimes merely lists of terms or characteristics entirely without explanation or development. For instance, in Chapter IV, under "The Master Psychological Drives," we have five "urges" subdivided into 25 "emotions," which leave one not much the wiser.

The theory of the subconscious mind is tacitly assumed to be a fact. The student reading this text would inevitably get the idea that this interesting hypothesis was a matter of proven and conservative medical knowledge. This seems to be taking too much for granted in an elementary text.

The treatment of mental mechanisms and of fantasy are much clearer, and should be understandable by the group for whom it was written. There is here a definite effort to present developmental and preventive points of view.

In Part II much more attention is given to the psychoneuroses than is usual in books on nursing and this is a desirable emphasis, as these conditions will be met in great numbers by the nurse in general practice. However, it is perhaps unnecessary for a student nurse to learn 13 theories of the etiology of these reactions (one of which is subdivided into eight) in order to understand the patient and co-operate intelligently in treatment.

Part III deals with the major psychoses in much the usual way. The nursing suggestions are conventional.

Part IV, "Psychotherapeutics," contains the greater part of the material specifically on nursing. The nurse is urged to learn to distinguish between "real" and "half-baked" psychiatry, which seems like good advice but the author doesn't indicate how to do it. She is urged to practice introspection, starting with an examination of her motives for nursing. It is pointed out that courses in psychiatric nursing should help the nurse in her own psychic and emotional life. The personality which is likely to be successful in this exacting field of nursing is described; the author recommends a person who is comparatively free from difficulties in her own mental life; a somewhat "commanding personality," capable of understanding and dealing with any incipient prejudice aroused in her own mind by contacts with patients; one who adjusts with relative ease to hospital conditions and requirements;

courageous and cheerful, and "dominated by a real spirit of social service." A course in psychiatric nursing "should particularly emphasize the importance of intelligent technics for presenting mental illness." "Among other purposes is that of impressing the nurse with the importance of becoming a confidential friend and wise counsellor to her patients, as well as a real companion in their recreational and occupational activities." This is surely all most true, and its statement could not fail to be useful to the student reading it. There is a tendency however to present commonplace inspirational maxims which do not add to the value of the book. One would agree that lengthy discussions of massage, hydrotherapy, exercise, diet, have been wisely omitted on the ground that these subjects are fully presented in other books, but the omission of occupational therapy seems unfortunate. It does not seem possible adequately to discuss psychiatric nursing without including such an important method of psychotherapy, and one in which the nurse must take so large a share.

The purposes of the author are stated in the preface. "This book has been written not only with the idea of familiarizing the nurse with the general outlines of psychiatric nursing, but also with that of making her more observant of all the symptoms of disease and of teaching her to become more efficient in the psychiatric interpretation of the symptomatology of all human ailments"; and also to meet the requirements of the curriculum prepared by the National League of Nursing Education. Some of these have been met but two of the objectives of this curriculum which do not appear to have been fully considered are: "To better appreciate social problems associated with mental illness and the community facilities for dealing with these problems"; and "To appreciate the nurse's responsibility in furthering a mental health program in the community."

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Social Behavior and Child Personality; an Exploratory Study of Some Roots of Sympathy. By *Lois B. Murphy*. (New York: Columbia University Press, 1937.)

This is an interesting and suggestive study of sympathetic behavior, *i. e.*, reaction to distress in others, among children between two and four years of age who were observed in a nursery school. The material was gathered on the basis of daily observation over a period of months, from teachers' inventories of social behavior, from framed situations devised to reproduce conditions arousing sympathy experimentally, from daily records made by several parents and from a fuller conference with parents. The purposes were to study sympathy (1) as a sector of behavior, (2) in terms of the stimuli, (3) in cross section, (4) in relation to groups of individuals, (5) as an aspect of total personality, (6) as studied genetically, and in context of situation and culture.

After an historical review there comes a discussion of the cultural setting: The world of adults with its individualistic attitudes, conflicts, and institu-

tionalized sympathies, and the world of nursery school children with play mirroring adult cultures, conflicts largely over property, ambivalent behavior of competition and cooperation, aggression and sympathy, attack and comfort, ego-value and love.

The second part, "Analysis of Sympathetic Behavior in Nursery School Children," takes up varieties of sympathetic and unsympathetic responses, group structure, and the relationships between individuals, quantitative relations between sympathetic and other social behavior, and variations in relation to motivation on the playground and in framed situations. In the discussion of detailed protocols there are many keen and helpful observations, and it is in these that the greatest value of the book lies for the child psychiatrist. Social interaction begins when one child responds to the desire of another, and sympathy arises only after the child has already developed physical and verbal control. Sympathetic behavior correlated positively with aggressive behavior; the child showing more of the one showed more of the other as well. Groups with smaller play space and narrower age range displayed fewer sympathetic and more unsympathetic reactions because of the keener competition such a restrictive situation called forth. This is in line with the greater jealousy noted in siblings between whom there is less than four years' difference. Sharing property when there is plenty to share lays the foundation for sharing that involves sacrifice. In general, sympathetic responses increased with age and intelligence; differences in the sexes were slight. Sympathy, leadership and friendships increased hand in hand with resistance and aggression.

Individual children showed different patterns of giving and receiving sympathy, as the author depicts strikingly in a diagram showing the relation of every child to every other one in the group. It was the most insecure child who excluded the others. Sympathy depends on the functional relation of the child to each situation, change in status giving a changed interpretation of the situation and a change in response. With experience in the group, the whole picture of the giving and receiving of sympathy for any individual child changes. In the framed situations, *e. g.*, pictures, stories, questions, a baby in her play pen with her toys just out of her reach, etc., the children responded selectively in terms of the meaning of the situation to them, in the light of their previous experience and special sensitivities. In some, sympathy proved to be masked aggression, in others projected anxiety. The actively cooperative reaction of sympathy came after the child's experience with similar situations. Lack of preparedness for handling a situation actively led to accentuation of responses on the emotional level. When satisfaction was attained from the emotional type of reaction, the constructive practical method was delayed in development. Only when the material was simple and not charged with emotion was the child apt to be objective in the experimental situation.

Each child has a characteristic tendency toward sympathetic responses as regards the tempo, the duration, the intensity and the mode of reaction. This may be verbal, motor or emotional, depending on the readiest resource of the individual which is determined by the neuromuscular tendencies, and

modified by habit. Sympathy itself is thought of as being biologically-rooted, while the situations are learned; the amount and character of sympathy is determined by the culture. Sympathy begins with early responses to crying and becomes more and more socialized with progressive emancipation from dependence and with increased consciousness of self. Thresholds are lowered by group formation. The presence of stable objects of sympathy, identification and previous experience with them, all tend to lead more readily to the response. Situations of competition definitely inhibit sympathetic manifestations.

In the last division, "Synthesis and Interpretation," the author concludes that mere samples of behavior in a situation are insufficient to lead to an understanding of the behavior. Personality functions are interwoven with, and conditioned by, each other. What at first appeared as independent "traits" of aggression and sympathy were found to correlate with one another consistently, thus indicating that both are based on a larger tendency toward outgoing responses. The "trait" as it demonstrated itself in the nursery school showed correlation with its appearance in the experimental situation. This points to the need for reorientation in terms of *range of behavior possibilities*. The range takes into account the recurrent modes of reaction and also those less stable features which depend on shifting values of specific setting and their meaning to the individual. Differences within the range hinge on intra-organismic patterns and on differences in experience within the culture. Personality at any time is "defined in terms of range of responses and their various nodal or peak points, elicited by the range of situations to which it has been and is exposed." The stable tendencies and the patterns of variation constitute the material of the personality.

EUGENIA S. CAMERON, M. D.,
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A PÆDIATRICIAN IN SEARCH OF MENTAL HYGIENE. By *Bronson Crothers, M. D.* (New York: The Commonwealth Fund, 1937.)

The writer, a conventionally trained pædiatrician keenly interested in neurology, has written this book in an attempt to bring some of the contributions of psychiatry to bear upon the problems of children. In general, he feels that most pædiatricians are unaware of the contributions of the psychiatrists, psychologists, educationists, and social workers to those problems of childhood.

The book is organized under three headings: mental hygiene in the practice of medicine; mental hygiene in the teaching of medicine; and methods of meeting the pædiatrician's responsibility. The arrangement of the subject matter is rather vague and it is often hard to follow the author to his conclusions. It is replete with numerous thoughtful and philosophical discussions of various phases in pædiatrics—psychiatry, mental hygiene, education and social work. The main value of the book lies in the fullness and clarity with which the author discusses the controversial points which beset the pædiatrician who is interested in the mental welfare of his patients,

rather than in outlining any practical methods which can be utilized by the pædiatrician in practice.

In Part 1 he discusses the relationship of the physician to his community and the changes that have taken place in that relationship through the introduction of increased laboratory techniques and the development of the specialties. He considers why mental hygiene has been refused by the physician at large and why mental hygiene is now separated from the practice of medicine. He considers the change in the parent-child and child-school relationships of recent years, the decrease in the religious control of the home, the parents and child trapped in a fast moving, confused and relatively insecure world and forced to adopt new standards and attitudes, and the changes in education based upon psychological appraisal and progressive methods of teaching.

In Part 2 he discusses medical education and the changes during the last quarter century. He discusses the organization of a children's hospital and feels that the problem in a pædiatric hospital is not one of setting up a new behavior clinic, but rather of making the pædiatrician aware of behavior as a routine consideration of cases passing through the clinic. Such a special clinic is liable to be isolated from the rest of the hospital and to be swamped by outside agencies requesting solutions of scholastic and social problems. As instituted at the present time these clinics show little uniformity of opinion as to personnel, aims or therapy. Some believe that most of the work should be done with the child, and use methods varying from very simple approaches to deep psychoanalytical methods. Others consider the parents as the major problem and deal with them directly or through psychiatric social workers. The purposes of such clinics vary—some intend to serve the psychiatric needs of the community, some desire to carry on research and others are primarily interested in diffusing knowledge to parents and physicians.

A chapter is devoted to the study of the position of the psychologist in a children's hospital. The author considers that a good psychologist is more than a psychometrist and should be given adequate opportunities to observe the behavior of children in the hospital. The best results can only by obtained through close cooperation and team play with the medical staff. Similarly the social worker will be of the greatest value if there is such an arrangement based upon mutual respect and understanding.

Part 3 defines Dr. Crothers' attitudes and beliefs, and outlines the present routine at the Children's Hospital in Boston. He considers that the adequate pædiatrician should: (a) be able to correctly handle the diseases of childhood; (b) have some knowledge and contact with education; (c) be able to utilize psychometrics and some principles of psychology; (d) have some knowledge of the social aspects of disease. He should be able to deal with the psychological aspects of organic disease and assist the parents in meeting minor problems and in helping develop correct habit formation in infancy and childhood. Those children whose problems are primarily in the emotional or intellectual sphere are in most cases better handled by a physician with special psychiatric training.

This book should be considered as an individual's reaction to the complex problems besetting one interested in the mental hygiene aspects of childhood. Its practical applications to the general pædiatrician are few and its greatest value appears to be to those already interested in the field of pædiatric mental hygiene.

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MENTAL THERAPY. By *Louis S. London, M. D.* 2 vols. (New York: Covici-Friede, 1937.)

In this two-volume work the author gives 35 pages of general orientation in which the field of psychoanalysis is briefly considered. The remainder of the book consists of the presentation of varying amounts of material from 50 case records. Reading hundreds of pages, one finds hardly a sentence on the subject of therapy. Indeed the introduction states that "the main purpose of the book has been to show the interrelations between the neuroses and the psychoses. . . . ." The approach to the case studies is likewise misleading, for although one is led to suppose that psychoanalytic methods of therapy and study have been used and will be illustrated, there is little or no explicit indication of such technique.

One is left bewildered as to how any of the results vaguely referred to have been obtained. Such curt statements as the following abound, "The patient was freed of his syphilophobia after a short analysis. . . . ." These announcements follow a mere recital of masses of personal history arranged in chronological order. Numerous dreams of the patients are interspersed and dogmatic interpretations of them are asserted without material to show how they were arrived at. Neither is there any attempt to indicate the effects upon the patients obtained by the interpretations offered. In general there is a regrettable absence of showing of cause and effect relationships. The material is so copious that one is constantly expectant of some explanations as to what sequence of presentation occurred, what methods were employed, and what results were obtained. But there is practically none of this. The cases as given are life stories in which an occasional interpretative guess is hazarded as an *ex cathedra* statement. This may not actually have been the case, but as the book is written the reader has no choice but to assume it.

A vast amount of detail of the patients' sexual activities and thoughts is given. This might be expected in a psychoanalytical presentation but here it is so massed, often without comment, as to give at times a pornographic rather than a scientific impression. Mere statement of sex material may be interesting but it is not educational or therapeutic. Most of such material in this book is set down without any points being made of it. In the life stories one may imagine that one situation contributed to the production of another but no such causal relationships in the treatment can be conjectured.

One discovers but rare and brief mention in the text of that "therapy" which stands in the book's title. The following are typical of the few such

allusions, "The treatment was entirely psychotherapeutic and continued in active form for about a year," "The method of therapy was entirely psychotherapeutic." Perhaps the most elaborate consecutive discussion of therapy in the book occurs on page 740, "It was very difficult to get this patient into a satisfactory transference. Attempts were made at the beginning to get him to lie on the couch, not to analyse him but to question him in a relaxed condition (psychoanalytic approach) but when placed there he would jump up and state that he had nothing to say . . . . The treatment therefore had to be entirely psychotherapeutic (suggestion.)"

The book contains a startling number of gross misstatements and erroneous implications. This is unfortunate in a work for which the claim is made that it "is a work of unquestionable authority" which "will become a landmark in the history of psychoanalysis" and will displace Havelock Ellis and Krafft-Ebbing. In his glossary London states of the superego that "Freud also called it the id." He describes anxiety as synonymous with fear. Of a patient with periodic losses of consciousness with syncope, he remarks that this occurs in manic-depressive and schizophrenic psychoses. He is unclear as to the criteria for diagnosing a mixed manic-depressive psychosis. He asserts that a history of a previous attack can be considered as "pathognomonic" of manic-depressive illness. He excludes the diagnosis of a manic-depressive psychosis because the patient was in a first attack. He states that since the advent of psychoanalysis no attempts have been made to determine the dynamics of schizophrenia. He "believes" that Jung uses a different technique than some of the other psychoanalysts. London describes his use of a "method of persuasion" by which false promises were made to a psychotic patient each week for several months. A typical account of the details of treatment in a specific case is the following. "The patient was subjected to an analysis which lasted 55 sessions. At the end of this time his insomnia had improved to such a degree that he did not care to continue further analysis. He had not recovered entirely from his anxiety state." He appears not to be familiar with all of his technical terms as illustrated by his use of "abreact" on page 535; "superego" on page 758; "id" on page 760; "platonic" on page 477; "agora phobia" in a chronic hallucinating patient; "taboo" on page 75.

One gets an impression of naïveté in such characteristic expressions as the following; "He was advised to meet the psychoanalytic situation"; "He began masturbation at an early age"; the statement that a child could not have remembered an incident at the age of 3. The inclusion of irrelevant sexual data about a friend of the patient gives the impression of gossip. The author is variably self-contradictory. He asserts on page 277 that a stereotyped study of symbolism cannot be used in analyzing dreams. Nevertheless he uses it throughout the book with no supplementary data to make it convincing. He describes how in the course of what purports to be orthodox psychoanalysis he warns, threatens, urges, recommends, or hoodwinks his patients. He thinks it proper to punish a patient whose analysis vents sadism on the analyst by discontinuing the analysis for a week because

"this shows the patient that the analyst has more power than she has" (page 242). At one point he so loses himself in the flight of a manic patient that he quotes verbatim 24 solid pages of the production. He says that the morals of a homosexual must be altered. On page 24 he asserts that "With the Freudians dream interpretation is now obsolete." The author expresses his personal opinion that each sensory nerve cell individually has a conscious part and an unconscious part.

To the reviewer it seems most unfortunate that such a book appears. It is not a work on therapy. It betrays an inaccurate, often erroneous, conception of psychoanalysis and varies importantly from its principles. Its claims throughout are too broad. It should be classified merely as a collection of intimate details in the life stories of 50 patients.

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CAUSES OF CRIME. BIOLOGICAL THEORIES IN THE UNITED STATES, 1800-1915. By *Arthur E. Fink*. (Philadelphia: University of Pennsylvania Press. London: Humphrey Milford, Oxford University Press. 1938.)

Pointing out that sociologists have long been familiar with European studies on the biological factors in criminal behavior, reaching back many years, the author remarks the surprising lack of attention which has been paid to American contributions in this field. The present study is designed to meet this need.

Its scope is limited to consideration of non-environmental factors only, the starting point being the inquiries of those early American physicians "who had already gone beyond the limits of the physical body of man and had seen him as a human being operating in relation to other human beings."

It begins with Benjamin Rush and his contemporaries and ends with William Healy, who by inaugurating the individual case method stood at the threshold of the new era of crime study in America. It is with the intervening period and with the biological, anthropological and psychological approaches that the author is primarily concerned.

The material is dealt with under the following headings: phrenology, insanity, moral insanity, alcohol and drugs, criminal anthropology—the anatomy and physiology of the criminal, heredity—including discussion of the Jukes and sterilization, feeblemindedness. At the end of each chapter a useful summary with conclusions is appended.

The author has consulted original sources and carefully studied them, and he makes use of ample quotations to illustrate the changing viewpoints as to the causation of criminal behavior, pointing out that "much of what passed for cause in the nineteenth century would be termed correlation today." In discussing heredity studies such as those of the Jukes and Kallikak families the author, while taking great care to present fairly the views of the writers of those books, and thus correct certain uncritical opinions which have been based upon them, does not comment specifically upon the unsatisfactory nature of such studies from the standpoint of method of collecting and evaluating data.

The various attempts to explain criminal behavior have been conditioned, as the author points out, by the cultural and scientific background of the time. In the strongly theological atmosphere of the early days of the Colonies, belief in the essentially inborn nature of crime prevailed. The transition from theology and metaphysics to the concepts of science was marked by the rise of phrenology which accounted for criminal conduct as it did for other human "propensities." With the recognition of the significance of environment in influencing growth and health and behavior, the social factors in crime rose in importance. Conduct, normal or deviate, was looked upon in the light of the new biology of the individual. Out of the late nineteenth century developments in psychiatry, psychology, biology, the introduction of the case study method and the rise of the science of statistics has emerged the criminology of today.

The conspicuous part played by physicians in this succession of events is duly chronicled in this book. In its 250 pages of text is digested a very considerable amount of material from the literature dating from the early nineteenth century (the appended bibliography occupies 50 pages); the resulting volume is an excellent and distinguished introduction to the study of crime for whomever has to deal with that aspect of human behavior, or indeed interests himself in the pathology of human relations.

C. B. F.

FREDERICK PETERSON, M. D., PH. D., LL. D.
MARCH 1, 1859–JULY 9, 1938.

UNIV. OF MICH.

In Memoriam.

FREDERICK PETERSON.

Sound Psychiatrist, Great Scholar, True Poet.

A FRIEND'S TRIBUTE.

(Bernard Sachs.)

Of writing—obituaries—there is no end, especially if one has the sad experience of seeing many of one's closest friends pass to the great Beyond. Obituaries, as such, I dislike writing; but a parting tribute soothes one's own grief and helps to form a true estimate of the services rendered by the Dead, and of what his friendship, which had continued uninterruptedly for fully half a century, meant to the Dead and to me.

In 1887, Peterson, of distinguished Swedish descent, born and educated in America, had finished his studies abroad, and had served as assistant physician at the Poughkeepsie State Institution.

He came to New York, bringing a letter from a Harvard classmate of mine suggesting that we might find it mutually agreeable—young as we both were—to work together. We joined forces at the New York Polyclinic and began the research which resulted in the publication in 1890 of "Infantile Cerebral Palsies," which, in its day, met with considerable favor. That any one has written dozens of articles means little. It is the spirit back of the work, the honest and unbiased search for truth, the enthusiastic support of genuine scientific inquiry that made Peterson a most stimulating companion at a time when American neurology and psychiatry were beginning to achieve results that compelled general approval and some admiration.

To the names of Hughlings Jackson, Charcot, Erb and Westphal, the names of Weir Mitchell, the elder Hammond, of Seguin and E. C. Spitzka were joined properly enough as those who were guiding the destinies of neurology and psychiatry; and a younger

New York group * appeared on the horizon in the early eighties, including Starr, Dana, Peterson (may I add, Sachs) to be joined a little later by Joseph Collins and Pearce Bailey.

In the next two decades, Peterson did excellent work as Starr's Chief of Clinic, and later on as Professor of Psychiatry at Columbia, as head of Craig Colony for Epileptics, for the development of which he was chiefly responsible, and as head of the New York State Lunacy Commission. It was at this time too that he published his textbook with Church, and wrote many—not too many—finely conceived articles in professional and lay journals on subjects within his own specialty and covering a wide array of cultural interests.

Above all else, Peterson was a great scholar, a lover of the arts and in his own right a distinguished poet. The poems of Ta-Pai Shun proved how thoroughly he had imbibed the spirit of Chinese art and Chinese life, and to his last days, those who knew him well, could think of him only as surrounded and influenced by his Chinese treasures. He seemed to be possessed of the judicial calm and insight of a Chinese philosopher.

In 1898, Dana, Collins, Peterson and Sachs started the Charaka Club, and during those 40 years, at the meetings of that Club, Peterson was at his best when he recited "In the Shade of Ygdrasil" and other Chinese verses. It was at these meetings, too, that he was at his best in giving his intimate associates the benefit of his unusual culture, his wide knowledge of the Orient, and his deep insight into the spiritual and moral make-up of his fellowmen.

His abhorrence of sham, his unwillingness to be taken off his feet by fantastic doctrines of the day, made him a pillar of strength for those who like him were most anxious to guard the development of psychiatry in America along sound scientific lines. The greater the pity that he was not allowed to witness the further development of organic psychiatry now impending.

Peterson had a great sense of humor, which helped to develop a real joy of life. Only a few weeks before his death, I asked him how he felt. "Well, I have survived several incurable diseases; I

* There was a close bond with the Philadelphians—Mills, Spiller, Dercum, Burr.

have no right to complain." But many of us deplore the loss of a great physician, a true friend, a fine citizen.

As in "The Deserted Garden," Pai Ta-Shun —

I hear no more the swish of silk
Along the marble walks;
The Autumn wind blows sharp and cold
Among the flowerless stalks.

In place of petals of the peach
Fast drift the yellow leaf;
And looking in the lotus-pond
I see one face of grief.

FREDERICK TILNEY.

1876–1938.

When Dr. Frederick Tilney died on August 7, 1938, American neurology lost one of its most inspiring leaders. It is difficult to evaluate at this time just how much he meant to neurology in this country but those who worked with him feel that the loss is very great. He was a real leader in his field and an inspiring teacher. His influence was mostly on the scientific study of the nervous system, for primarily he was a research worker in the comparative anatomy of the central nervous system.

Dr. Tilney was born in Brooklyn, N. Y., on June 4, 1876, and after a preliminary education at the Brooklyn Polytechnic Institute he entered Yale University where he was graduated in 1897 with the degree of A. B. After a short essay in the field of newspaper work he entered The Long Island Medical College to train for the profession he was to honor. After receiving his degree of M. D. in 1903 he served an internship in the Kings County Hospital, Brooklyn, and then started the practice of medicine in this city of his birth.

He was interested in the nervous system from the start as indicated by his earliest publications. In 1906 he started his anatomical research work on the hypophysis in the laboratories of the College of Physicians and Surgeons, Columbia University.

Here he found his real field in anatomical studies, especially comparative anatomy of the central nervous system. This, he pur-

sued with energy all the rest of his life. At his death he was still working on the hypophysis. In 1908 he started teaching neuroanatomy and embryology both at Columbia university and at his medical Alma Mater.

In 1912 he was granted the degree of Ph. D. by Columbia University, and in 1914 was appointed associate professor of neurology at the College of Physicians and Surgeons. By 1915 he was professor of neurology and head of the department, and he continued in that position until his death. He was an enthusiastic teacher and an administrator of rare ability. The department of neurology was a small department affording only clinical teaching in the third and fourth years of the medical school when he took it over but gradually he worked it up to a major department teaching all of neurology, anatomy, physiology and pathology, as well as the clinical, through all the four years of the medical course. His capacity for hard work and his enthusiasm bore fruit in this growth of his department. The inspiration of his energy attracted to him the sort of men he liked to work with. They are carrying on his work conscious of the debt they owe to him.

He was a steady contributor to neurological literature but not a prolific writer. He wrote clearly in an easily readable style but he never wrote unless he was sure of what he had to say. His writings bear the stamp of the conscientious, self-critical research worker. In 1920 he published his first book "The Form and Functions of the Central Nervous System" (with Dr. H. A. Riley) which still remains a standard textbook.

An interlude in his work occurred in 1925 when he was stricken with a complete right hemiplegia. This would have terminated the career of a lesser man but Tilney never knew defeat. Gradually he fought his way back to as nearly complete recovery as is possible and then started out to do his most excellent and enduring work. In 1928 he published his greatest work—his two volume comparative study "The Brain from Ape to Man" which has become a neurological classic. In 1930 his more popular study of the brain, "The Master of Destiny" appeared, and was promptly chosen for distribution by the Scientific Book Club. During this time and later, his scientific publications appeared with regularity. These were the results of his mature mind, mostly on anatomy and embryology, in which fields he was an acknowledged master. His

most recent works on the development of the cerebral cortex and the comparative anatomy of the hippocampus are models of neuroanatomical research.

Dr. Tilney's colleagues were keenly conscious of his worth and showed this in electing him to offices in medical societies. First he was secretary-treasurer of the Brooklyn Neurological Society in 1907 and 1908, and president in 1911-1912; president of the New York Neurological Society 1917; secretary-treasurer of the American Neurological Association 1917-1925, and president 1926; vice-president of the New York Academy of Medicine 1931-1933, and trustee from 1935 until his death; trustee of the Long Island College of Medicine from 1937. In 1935 he was appointed medical director of the Neurological Institute of New York and led that hospital through the most critical period of its career. In January 1938, when the hospital was reorganized, he relinquished his post to become Director Emeritus. In 1929 Columbia University awarded him the honorary degree of Sc. D.

Besides the above societies Dr. Tilney was a member of The New York Psychiatric Society, The American Psychiatric Association and The Society for Research in Nervous and Mental Diseases. He was one of the founders of The New York Society for Clinical Psychiatry, a member of The Philadelphia Neurological Society, The Royal Society of Medicine (London) and The Vienna Society of Neurology and Psychiatry. He was an associate editor of The Archives of Neurology and Psychiatry from 1919 to 1934 and editor of The Neurological Bulletin from its first publication.

Tilney's unflagging energy and enthusiasm for his work were a constant surprise and inspiration to his friends. He never seemed to tire. Physically he knew fatigue, but mentally he was always alert with new ideas and new research problems. Along with all the rest he conducted a large and important practice in neurology and psychiatry. He gave as much of himself to his patients as he did to everything else he undertook.

In Tilney's death the loss to neurology was great, but the loss to his friends and associates was even greater. We shall miss the inspiration of his personality and his work but more than that we shall miss forever his gentle kindliness, his patience and bravery, his capacity always for seeing the other fellow's point of view, his

breadth of mind and his unselfishness, his general sense of humor and his laughter, and, most of all, the sincerity of his friendship and his love of people.

LOUIS CASAMAJOR, M. D.

JOHANNES LANGE.

1891–1938.

It is with keen regret that the JOURNAL must record the death, August 13, 1938, of Professor Lange of Breslau, co-founder with Professor A. Bostroem of the invaluable review *Fortschritte der Neurologie Psychiatrie und ihrer Grenzgebiete*, now in its tenth year. Lange's untimely death at 47 cut short a career in which had been accomplished what might well be regarded as the work of a long life time.

Lange's student days were spent in the universities of Leipzig, Kiel, Strasburg and Munich; and after four years as medical officer during the Great War he devoted himself to the field of psychiatry. He enjoyed the rare privilege of working long as a pupil of Kraepelin, and became the most trusted and beloved assistant of the Master. Kraepelin had counted on Lange to succeed him and carry on his work, and when in 1926 death interrupted the revision of his textbook, it was Lange who brought out the new edition of this monumental work.

In the same year he became associate professor of psychiatry and neurology and a director of the Institute for Psychiatric Research in Munich, which had been founded by Kraepelin. Four years later, when only 39 years old, he was appointed professor of psychiatry and neurology and director of the Neurological Clinic of the University of Breslau.

Almost every field of psychiatric practice and research has been enriched by contributions from Lange. His valuable textbook, which appeared in 1935, went into a second edition the following year, and a third was under way at the time of his death. He combined in rare quality and degree the characteristics of clinician, teacher, investigator, author and friend of his patients. In his death psychiatry, which knows no national boundaries, has suffered great loss.

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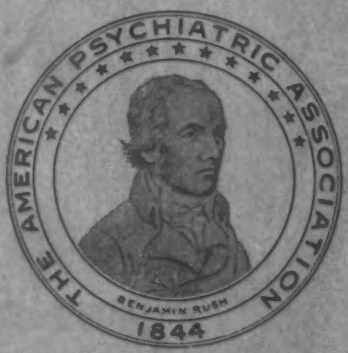

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NOVEMBER. CONTENTS. 1938

1. **The Biochemistry of Dementia Præcox.** *R. A. McFarland and H. Goldstein*..... 50

2. **Physiological Studies in Experimental Insulin and Metrazol Shock.** *Presented by G. Edward Hall*..... 55

3. **Early Schizophrenia.** *D. Ewen Cameron*..... 56

4. **Prognosis in Schizophrenia.** *John Romano and Franklin G. Ebaugh*..... 58

5. **Determinism in Psychiatry and Psychoanalysis.** *A. A. Brill*..... 59

6. **Verbalization and Language Symbols in Personality Adjustment.** *Mandel Sherman*.. 6

7. **Electroencephalographic Analyses of Behavior Problem Children.** *Herbert H. Jasper, Philip Solomon and Charles Bradley*..... 64

8. **Psychoses among College Students.** *Theophile Raphael and Mary A. Gordon*..... 65

9. **A Study of the Influence of Emotions and Affects on the Surface Temperature of the Human Body.** *Lloyd H. Ziegler and Paul T. Cash*..... 67

10. **The Seeming Aggravation of Drug Delirium After Withdrawal of the Drug, and its Bearing on the Question of the Harmfulness of Withdrawal.** *Max Levin*..... 69

11. **The Problem of the Alcoholic in the Community.** *Robert V. Seliger*..... 70

12. **Experiential Aspects of Huntington's Chorea.** *Ernest G. Lion and Eugen Kahn*..... 71

13. **Depressions Which Follow Apparent Success.** *Chester L. Carlisle*..... 72

14. **Correspondence:**

Commissions in Lunacy. *Winfred Overholser*..... 73

15. **Comment:**

The Chandler-Wallis Act, Kentucky.—Tribute to Dr. Hutchings..... 73

16. **News and Notes:**

Child Guidance Clinic in New Orleans.—Program 1939 Meeting.—Sigmund Freud Fellowship.—The Rockefeller Foundation. A Review for 1937.—The Tavistock Clinic. (The Institute of Medical Psychology.) Report for the Year 1937.—WPA Index of Research.—The A. A. A. S. Symposium on Mental Health.—Letchworth Village Survey.—Scientific Exhibit at the Chicago Meeting in 1939.—Rassegna di Neurologia Vegetativa.—Dr. Earl D. Bond Becomes Director of Research.—Third International Neurological Congress.—Massachusetts Commissioner of Mental Health.—Meyer Clinic at Rhode Island Hospital.—Association of Former Patients of the Psychiatric Institute, University of Illinois..... 74

17. **Book Reviews:**

Psychiatric Nursing. *William S. Sadler, M.D.*..... 75
Social Behavior and Child Personality: An Exploratory Study of Some Roots of Sympathy. *Lois B. Murphy*..... 75
A Pædiatrician in Search of Mental Hygiene. *Bronson Crothers*..... 75
Mental Therapy. *Louis S. London, M.D.*..... 75
Causes of Crime. Biological Theories in the United States, 1800-1915. *Arthur E. Fink*..... 76

18. **In Memoriam:**

Frederick Peterson. (*Bernard Sachs.*)..... 76
Frederick Tilney. *Louis Casamajor, M.D.*..... 76
Johannes Lange..... 76

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